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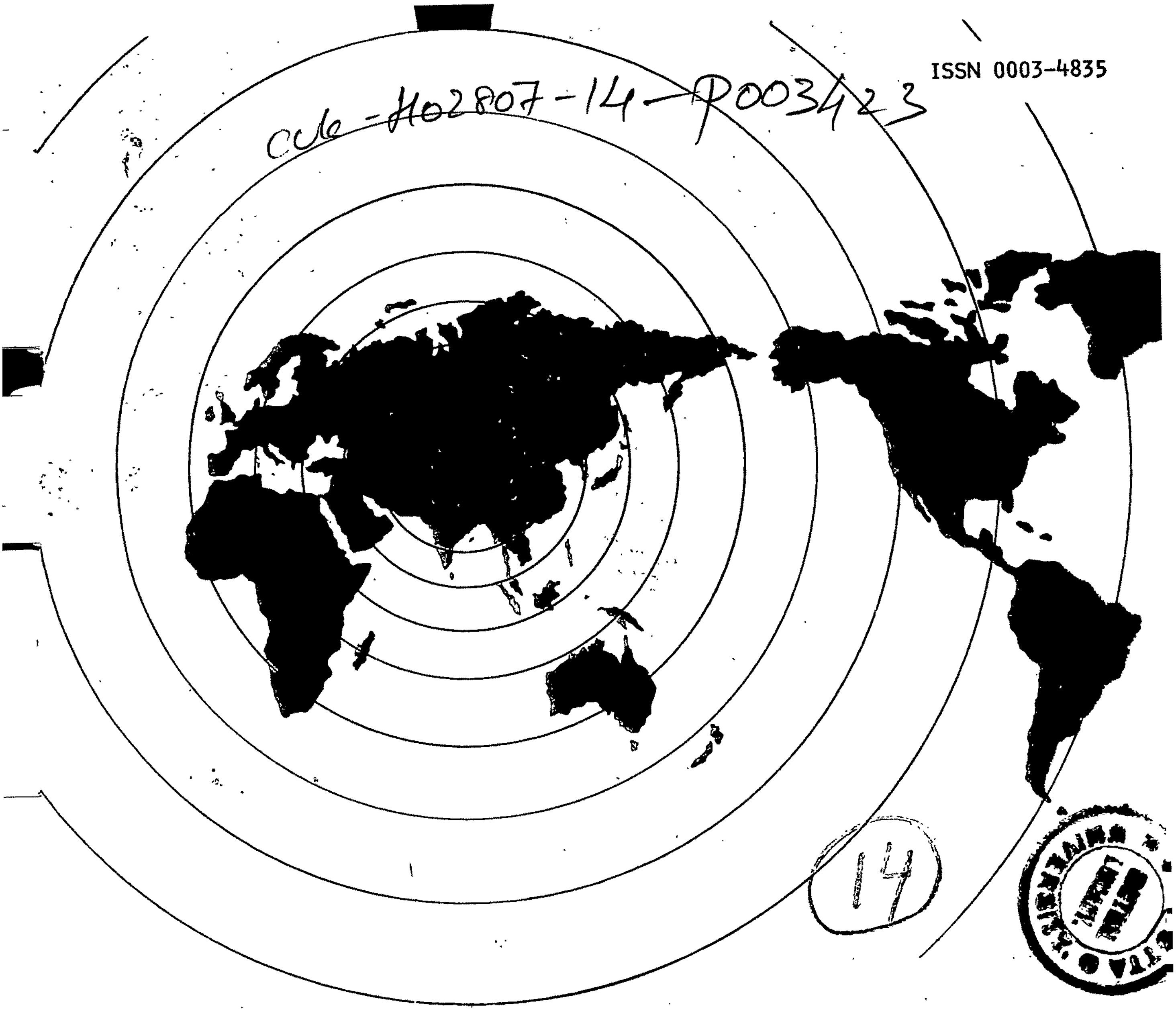

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SEMINAR ON THE APPLICATION OF MODERN TECHNOLOGY TO BIBLIOGRAPHIC CONTROL AND SERVICES, DELHI, 10-11 MARCH 1981

The Seminar was jointly organised by the British Council, INSDOC, the National Informatics Centre, the Society for Information Science and the Delhi Library Association, to coincide with the visit of Mr. Peter Lewis, Director-General, Bibliographic Services Division of the British Library, London. It was held at the TEC Centre, National Physical Laboratory, New Delhi and was attended by about 100 participants. The Seminar provided an opportunity for computer specialists, librarians and information workers to meet on a common platform and discuss problems and possibilities of using modern technologies in bibliographic control and provision of information services.

In his inaugural address, Dr. N. Seshagiri, Director, National Informatics Centre, emphasized the need for using modern technologies, especially computer technology, gave an idea of the immense possibilities in the field and what can be done in our country within the next two years or so. An abridged version of his speech is being reproduced at the end of this report.

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Next, a paper entitled "Computerisation of the national union catalogue of scientific serials -- planning and organisation of input" contributed by the Union Catalogue Section of INSDOC was presented by Shri B. Guha. This mainly detailed the input preparation and programmes of the Union Catalogue Section of INSDOC. This had an enthusiastic response from the audience by way of questions, comments and clarifications.

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One paper on the second theme of the session was prepared by Sarvashri R. Satyanarayana and T.N. Rajan, and presented by the first author. The paper provided a clear picture of how the advances in the disciplines of computer science, communication systems and reprographic techniques have revolutionised the information transfer processes in the world. In developing countries like ours, due to lack of trained personnel and other factors, we are not in a position to take advantage of these advancements. Information scientists should be more and more exposed to the modern techniques.

In the concluding session, chaired by Shri S.P. Phadnis, Shri T.N. Rajan summed up the deliberations of the two-day Seminar.

Dr. Seshagiri delivering the inaugural address

THE INAUGURAL ADDRESS BY DR. N. SESHAGIRI

INSDOC and the National Informatics Centre (NIC) have together embarked on a bold new joint venture — the setting up of a node for the NIC computer network at the premises of INSDOC. This marks the beginning of an experiment of far-reaching significance to the library movement in India and perhaps to this part of the world, a movement to which INSDOC has contributed pioneeringly and very significantly,in the past. NIC has now a growing network of computers in Delhi with about 20 minicomputers already installed or in the process of being installed as part of a computer communication network which will cover mostly Delhi, but also Bombay, Calcutta and Madras. INSDOC's role as a national focus for scientific and technical documentation will get amplified with the help of the NIC computer network and launch INSDOC into the computer age by jumping two generations of technologies — right into the domain of distributed bibliographic network on a distributed computer network. The need for a Distributed Bibliographic Network on a distributed computer network arises from several imperatives.

1. A bibliographic network would enable the marshalling of bibliographic resources from its environment to accomplish results beyond the ability of anyone of its members. For example, INSDOC and NIC hope to realize a network of low cost query terminals connected to the NIC-INSDOC terminal computer spanning in the first instance all the important science libraries and other sources in Delhi. The mechanism we are contemplating is straightforward. NIC has already established that it is possible to use the P&T lines for transmission upto 4800 bauds if we can use high quality modems. The HP-1000 computer node located at INSDOC can take a further branching of numerous channels to take on about 10 to 16 query terminals, one each in various science libraries in Delhi. Such query terminals are indigenously available and NIC is preparing to develop a protocol program for connecting a standard indigenous terminal to the HP-1000 by modifying the UT-200 protocol appropriately. Each such terminal may cost less than Rs.30,000 so that the ten terminals would cost about Rs.3 lakhs. The rental of P&T lines for this may come to a total of about Rs.1 lakh. NIC is already preparing itself to put up such a sub-network around the NIC-INSDOC computer node within about 2 years. After experimenting with this Delhi subnetwork, it is proposed to connect some of the libraries in Bombay, Calcutta, Bangalore and Hyderabad within a year more. Of course, initially, there will be a constraint. The large Cyber-720 host computer of NIC will have to store much of the voluminous databases on sources of documents along with other details of interest to the bibliographic retrieval. With 3 billion bytes of disc storage, this arrangement will give colossal storage capacity for this purpose.

2. The second aspect of the bibliographic network on the computer network is the facility of on-line cataloguing. The presentation of information-content on line can lead to new ways for the user to think of logical structure. I think it was Caryl McAllister who suggested that the present cataloguing rules are designed to serve the serial structure of the card catalogue and that in an online catalogue, each access point file — title, descriptor, author —

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3. NIC is already negotiating with several International Networks like Tymnet to enable the hooking on of the International Networks to the national computer network. Here, we hope to be able to link up with International Bibliographic databases to service various queries, especially in locating source of information.

4. The NIC-INSDOC cooperation is poised to go international in yet another sense. Under the UNESCO umbrella, a network of computers from Iran to Burma connecting the 9 countries in the south and central Asia region is under planning. Here, NIC is expected to play a major role in the setting up of the network while INSDOC is expected to play the role of a mother for scientific and technological database creation and servicing in the various participating countries.

I have just given four examples of the dimensions of the NIC-INSDOC cooperation, at present and in perspective, which typically represents the application of modern technology to bibliographic control and services - the topic of this seminar. In this progressive and appropriate setting, I have great pleasure in inaugurating this seminar.

SILVER JUBILEE PANEL DISCUSSION OF IASLIC

New Delhi, 17th February 1981

To mark the completion of the first twentyfive years of existence of IASLIC, its members have organised seminars, meetings, lectures, and get-togethers in various parts of the country. The members and other library and information professionals in Delhi decided to celebrate the occasion by having a close interaction with the users of information and others who are concerned with information. With this objective a Panel Discussion was arranged to exchange views on the general topic of "Information as a basic input to development".

The members of the Panel included, Prof. S. Sampath, Member, Union Public Service Commission (presently Director, Indian Institute of Technology, Kanpur) who also acted as the Moderator; Dr. J.K. Nigam, Director, Shri Ram Institute for Industrial Research; Major R. Thiagarajan, Director (Documentation & Information) Department of Science and Technology; Shri Ram D. Taneja, Deputy Director-General, Indian Standards Institution; Prof. P.B. Mangla, Department of Library Science, Delhi University; and Shri B. Guha, Scientist, Insdoc.

The Panel discussed a wide range of issues. A summary of them and the views expressed are presented below:

The first issue was relating to public awareness of the value of information in socio-economic development in the country. Most speakers emphasised that the value of information was well recognised in the academic and research contexts and most of our information services were directed towards such higher echelons of social activities. It was pointed out that efforts must be made to take information to our farmers, craftsmen, small enterpreneurs and to our administrators. Only by using information they will become aware of the importance of information.

The above brought into focus the question of dissemination of relevant information in appropriate manner to the above mentioned groups of people. The importance of processing of information, keeping in view the need and aspirations of the user at different levels, was well recognised by all.

A discussion on information processing and other services that are being asked for from our libraries and information centres, naturally brought the Panel to deliberate on the issue of education of librarians and other information professionals. Are they properly equipped to meet such challenges? In this context Prof. P.B. Mangla gave an over-all view of the educational pattern, courses and facilities available. He conceded that our syllabi have to be given a fresh look. At the same time he maintained that some of our library schools have been revising their syllabi. It is not possible to recommend a uniform training programme which will be useful for all the professionals. The programmes will have to be diversified.

Specialised programmes will have to be designed for those persons who will repackage information to serve the neo-literates. In this context, Dr. Nigam mentioned, "...as a user of information served to me, I have a feeling that there is a significant difference in the standard of education at our library schools. There are a few schools which are as good as anywhere, but there are others which are imparting outmoded education and are in need of a revision of syllabi".

A closely related issue of the role of technologies in the processing of information was taken up next. Major Thiagarajan gave a national perspective on the kind of things the technologies could bring in. He emphasised that any amount of technological facilities will be of no use unless we are willing to share our pieces of information with other parties. To emphasise the probable effects of technologies, he said, "The twentieth century brought in paper in a big way and, perhaps, the twentyfirst century will remove it. We should be able to prepare ourselves for the paperless form of communication".

The next issue to be discussed was the role of standardization in the processing, exchange and dissemination of information. Shri Taneja dwelt at length on various aspects of this issue.

At the end Prof. Sampath very competently summarised the whole discussions. While doing so, he said, "So, we agree that there is a need for national commitment to the development and use of information as a very important item which will form input to all programmes in our development processes. I recall a statement made by U Thant when he was the UN Secretary General, long before the present oil crisis but the fundamental truth remains, wherein he said, in the world of today it is no longer the mere possession of resources that is going to matter but it is the way that societies make up their mind as to how those resources are going to be used... Because we have limited resources ... for our development. To be able to use our resources, not merely those who plan but all way down the line, an optimal way in order to reach the goals that we have, it is necessary to have useful and relevant information".

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A discussion on information processing and other services that are being asked for from our libraries and information centres, naturally brought the Panel to deliberate on the issue of education of librarians and other information professionals. Are they properly equipped to meet such challenges? In this context Prof. P.B. Mangla gave an over-all view of the educational pattern, courses and facilities available. He conceded that our syllabi have to be given a fresh look. At the same time he maintained that some of our library schools have been revising their syllabi. It is not possible to recommend a uniform training programme which will be useful for all the professionals. The programmes will have to be diversified.

Specialised programmes will have to be designed for those persons who will repackage information to serve the neo-literates. In this context, Dr. Nigam mentioned, "...as a user of information served to me, I have a feeling that there is a significant difference in the standard of education at our library schools. There are a few schools which are as good as anywhere, but there are others which are imparting outmoded education and are in need of a revision of syllabi".

A closely related issue of the role of technologies in the processing of information was taken up next. Major Thiagarajan gave a national perspective on the kind of things the technologies could bring in. He emphasised that any amount of technological facilities will be of no use unless we are willing to share our pieces of information with other parties. To emphasise the probable effects of technologies, he said, "The twentieth century brought in paper in a big way and, perhaps, the twentyfirst century will remove it. We should be able to prepare ourselves for the paperless form of communication".

The next issue to be discussed was the role of standardization in the processing, exchange and dissemination of information. Shri Taneja dwelt at length on various aspects of this issue.

At the end Prof. Sampath very competently summarised the whole discussions. While doing so, he said, "So, we agree that there is a need for national commitment to the development and use of information as a very important item which will form input to all programmes in our development processes. I recall a statement made by U Thant when he was the UN Secretary General, long before the present oil crisis but the fundamental truth remains, wherein he said, in the world of today it is no longer the mere possession of resources that is going to matter but it is the way that societies make up their mind as to how those resources are going to be used... Because we have limited resources ... for our development. To be able to use our resources, not merely those who plan but all way down the line, an optimal way in order to reach the goals that we have, it is necessary to have useful and relevant information".

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INFORMATION, COMMUNICATION AND TECHNOLOGY TRANSFER: A REVIEW OF LITERATURE

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Defines the concepts of science, technology and technology transfer. Describes the three stages in technology transfer, namely idea generation, problem solving and implementation and diffusion. Discusses the type, source, and channels of information used under the above three stages of technology transfer.

INTRODUCTION

Before initiating such a topic, it will be appropriate to consider the definitions and concepts of science, technology and technology transfer. Science and technology in fact are not quite separate. For convenience, however, one may state that science is persued for the sake of knowledge and insight. Technology is essentially an applied science. It is a codified way of doing things based on scientific knowledge coupled with experience to suit specific conditions. Science is investigating, measuring, understanding and acquisition of knowledge. Technology constructs, creates, accomplishes with the application of knowledge. Technology is also specific and it is the application of science to the solving of well defined problems. While scientific knowledge may have wide applications and form the basis of several technologies, technology is developed along a much narrow front. For example, the thermodynamical principles of internal combustion engine are well known but the technology of petrol engines will vary in detail to meet each application and to satisfy local conditions. This does not of course, mean that there is no interaction between technologies or that a need cannot be satisfied by more than one technological route (e.g. a control can be actuated by mechanical, electrical, hydraulic means). But once the technological route has been chosen, the development of that technology becomes increasingly specific.

In earlier times, the technological progress or achievements were possibly based on empirical knowledge and age long experience and "tricks of trade" with little cross-fertilization from science. For example, the invention of telegraphy was achieved without the development of relevant equations describing the signals or wires. But today's technology is closely dependent upon science, and technology in turn promotes science, stressing the need for intimate interaction between science and technology.

Technology spectrum covers the know-how related to process and product; design and engineering; erection; commissioning and production; performance testing and marketability. Technology involves patents, design, trade marks, technological data, ability to put things together, to make things work, to develop and satisfy the customer.

Technology transfer is essentially a coupling between people who produce technology and those who need it. A very broad-based definition has been attempted by Brooks[1] which describes it as "The process by which science and technology are diffused throughout the human activity. Wherever systematic rational knowledge developed by one group or institution is embodied in a way of doing things by other institutions. This can be either transfer from mere basic knowledge into technology or adaptation of an existing technology to a new use. Technology transfer differs from ordinary scientific information transfer in the fact that to be really transferred it must be embodied in an actual operation of some kind". Brooks extends this discussion to recognize two types of transfer, which he designates as "vertical" and "horizontal". Vertical transfer is the process by which the technology is transferred from the more general to the more specific, for instance, by the incorporation of new scientific knowledge into technology and by the embodiment of a "state of the art" into a system. Horizontal transfer involves the adaptation of technology from one application to another. The success of technology transfer depends upon several factors such as: technology generator; receiver; channels and techniques of transmitter; and the climate.

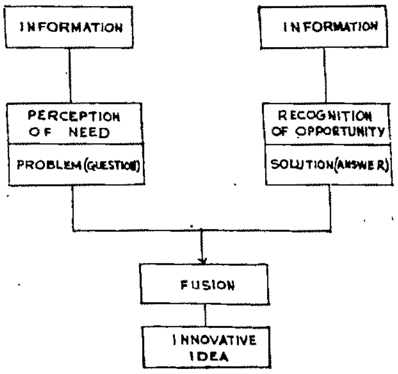
The process of technological transfer can be broken into the following three stages for the purpose of simplification of idea generation and design concept formulation; problem solving and engineering; and commercialization or implementation and diffusion.

It is generally believed that information and communication play a very important role in the process of technology transfer and this belief has been strengthened by numerous empirical studies. This paper attempts to review a large number of such studies under the three stages of technology transfer mentioned earlier.

2. IDEA-GENERATION

Among the numerous factors that influence the success or failure of a research group involved in technology transfer, creativity of its members and process of idea-generation by the team as a whole are most important. Successful generation of ideas for new or improved products require a base of reliable information. Even the most creative individuals require information input in order to release their potential. Therefore it is important to be aware of the type, sources and channels of information utilized in idea-generation. The idea-generation phase is operationally defined to extend from the time of the first communication related to the idea until the time at which a proposal is written or at which the work is funded, or at which the major effort of atleast one person is directed towards work on the idea. Now before we study this, it will be necessary to look at the idea-generation process as such. Figure I provides a simplified model of the process involved in idea-generation.

FIG. 1: THE FUSION MODEL OF IDEA GENERATION.



This model is based on the assumption that innovative idea emerges as a fusion of a perceived organizational need or problem or opportunity relevant to organizational objectives with the recognition of technical opportunity or means or techniques by which to satisfy the need, solve the problem or capitalise on the opportunity[2,3]. The definition of the problem will depend upon the kind of information that the problem solver is exposed to. The need may have existed for a long time, it may be rather new or it may be latent. The solution of the problem will emerge as a technical opportunity, the character of which is also dependent on the kind of information received. It may be stored information in terms of knowledge received earlier through studies, practical experience, etc or, direct information acquired in connection with a specific problem through printed material or by talking to people. The event leading to the recognition of relevant need, problem or opportunity may be termed as "need event", while the event leading to the recognition means or technique may be referred to as the "mean event" The recognition of "need" and "means" interact with the innate creative ability of the researcher in a complex manner to generate an idea. A large number of researchers like Globe et al[4], Langrish et al[5], Myers and Marquis[6] have studied the relative importance of these events in innovations. According to them it appears that a large number of innovations are initiated by the discovery of an opportunity. On the other hand, most incremental or improvement innovations which represent the major part of the innovations in industrial companies start by receiving information that lead to the perception of a need, which then triggers off a technological solution. Now the still more important question is "how does the recognition take place and what is the mechanism where an idea is created. Pruthi and Nagpal[7] have provided a simplified model of idea-generation processes. They have hypthesised the following preconditions for the generation of an idea:

(a) A certain level of information in the mind of a scientist;
(b) Existence of the problem situation and its recognition by the scientist;
(c) Its ability to relate the information to the problem;
(d) A trigger which gives a quantum jump to his information level and makes it critical.

This trigger may be provided externally by an encounter with literature, experiment and analysis or interaction with a scientist inside or outside the group. Alternatively it may be provided internally by his own thinking process Theoretically, there should be only one trigger which leads to a sudden jump in the information level, but in their study Pruthi and Nagpal[7] have found certain cases wherein more than one trigger was identified which occurred almost simultaneously and the scientists were not able to recall as to which trigger occurred first and which trigger last.

2.1 Types, Sources and Channels of Information used in Idea-Generation

2.11 Types of Information

To begin with it will be interesting to know what type of information is stimulus to idea-generation. Goldhar et al[8] in one of their studies has analyzed the winners of IR-100 awards, and characterised the stimulus information as of two types - Technical (T) or Economic (E). The results of this study are indicated in Table 1, which indicate that economic information was responsible for about 70% of the time for the stimulus of their innovation. This split between technical and economic information is consistent with the 30% means, 70% needs stimulus division. In addition, 169 respondants out of 300 reported that the greatest value type of information slimulating their innovation was a type which they received regularly, while 130 reported the opposite. Of these 54% of means stimulated innovators reported, being stimulated by information of a type not regularly received while only 31% of need stimulated innovators reported the stimulus as having come from an irregular type of information.

TABLE 1

TYPE OF INFORMATION REPORTED HAVING GREATEST VALUES AS STIMULUS TO INNOVATION

Type of Information	% Reported as Greatest Value
General Market Need (E)	24
Your Own Recognition of a New Technological Possibility (T)	23
Specific New Technical Information (T)	14
A Specific Client's Need (E)	12
Your Own Recognition of a New Economic Opportunity (E)	7
Generally Available Technical Data (T)	7
Firm's Need for a New Product (E)	4
A Different Innovation (T)	2
A Production Requirement (T)	2
Your Firm's Need to Offer a Competetive Product (E)	1
A Need to Reduce Production Costs (E)	1
A Need to Reduce Product's Selling Price (E)	0

Note : E : Economic Information ;
T : Technical Information.

2.12 Sources of Information

Now turning to the sources of stimulus information, a large number of studies have been carried out in this area which have stressed or emphasised the role of internal and external sources as the major stimulants of technological innovation. Among the studies which rated high the internal sources are by Holt[9,10] Goldhar et al[8], Project SAPPHO[11], and Boldon Committee Enquiry on Small Firms[12]. Project SAPPHO has studied 86 innovations, 43 successful and 43 unsuccessful in two industries namely Chemical Processes and Scientific Instruments. It was found that 53% of the ideas were stimulated by internal sources. Bolton Committee of Enquiry was another study which sought the contribution to post-war innovations in the U.K. from firms of different sizes. The study classified the sources of ideas which led to initiation of 1667 important successful innovations in the manufacturing industry by different size of firms. It was reported that major portion of these ideas came from internal sources. The results of the study are presented in Table 2.

TABLE 2

INTERNAL SOURCES OF INFORMATION STIMULATION IDEA-GENERATION

Size of Firm	Percentage of Internal Sources Stimulating Innovation
Small	70.55
Medium	65.65
Large	48.87
Total	53.74

Holt has studied the product development in 30 Norwegian companies. He found that internal sources played the major role in idea-generation. Among the important internal sources reported, were R&D Department followed by Sales Department, Top Management and Production Department. Similarly in the study of Goldhar et al, 78% of the respondants reported that most important sources were the Internal (I). Among these, the major ones are: Innovator's prior experience and training (48%), technical colleague within the firm (12%), client or customer (6%), company marketing group (4%), etc. Regularity of the source was also studied which was reported by 168 respondants. While 132 respondants indicated that most important source stimulating their innovation was a irregular one. 53% of the means-stimulated innovators reported a irregular source of information while 41% of the need stimulated innovators reported similarly.

On the other side, there were studies by Myers and Marquis[6] Mueller, Langrish[13], Utterback[14], etc, which have emphasised the importance of external sources in idea generation. The results of these studies are presented in Table 3. Similar indications are also shown by studies of Peter[15] and Gordon[16]. Gordon in a study of 223 proposals for projects involving social-psychological aspects of disease also reports that consultation outside the work setting tends to increase the idea-generation. Peter studied the data concerning faculty in four Department at Massachuetts Institute of Technology (MIT), USA. He reported that 96% of the faculty members reporting innovative ideas are engaged in outside consulting as opposed to 55% of those not reporting ideas.

TABLE 3

SOURCES OF IDEAS CONTRIBUTING TO IDEA-GENERATION

Identification of the Study	Sources of Ideas Contributing to Idea Generation in Percentages	
	External	Internal
1. MYERS and MARQUIS	55	45
2. MUELLER	59	41
3. LANGRISH	64.5	35.5
4. UTTERBACK	64	34

Now it will be more interesting, if we look at the specific sources within external sources stimulating idea-generation. Industry is bound to be the major source of information among external sources stimulating ideas for R&D projects. The other important external sources are: Government agencies, universities, research associations, etc. This has been clearly depicted in the studies of Langrish et al, project SAPPHO and Bolton Committee as shown in Table 4.

TABLE 4

EXTERNALLY ORIGINATED IDEAS AS A PERCENTAGE OF ALL EXTERNALLY ORIGINATED IDEAS

External Sources	LANGRISH %	SAPPHO %	BOLTON Committee on Inquiry on Small Firms %
Private Industry	62.74	39	38.00
Universities	10	22	5.49
Government Agencies	20.59	28	14.86
Research Associations	-	--	9.71
Individuals	-	11	2.70
Others	6.67	--	29.24

2.13 Channels of communication

The channels of stimulus information can be categorised as either Informal (I) or Formal (F). Baker and Rubenstein[2] have identified various channels used in "need" and "means" event. He had found that 49% of the events were stimulated by interaction (informal channel). Of these, 47% of the total need event and 19% of the "mean" events were stimulated by interaction. In the study by Goldhar et al[8], 78% of the respondants reported informal channels as having of greatest value. Also 68% of the respondants reported that the channel was one through which information was regularly received. In addition, 39% of means stimulated innovators reported irregular channels, as did only 29% of need stimulated innovators. In another study Nagpal and Pruthi, who have studied one small and one big R&D Project, have found that formal communication played a leading role in idea-generation. Their results are presented in Table 5. Utterback[14] has also studied stimulating channels in idea-generation process in research projects before funding. He found that the stimulating inputs more often came from: discussion (57.6%), internal discussion (13.6%), and external discussion (44.0%) followed by literature (15.2%), analysis and experiment (13.6%), experience (10.2%), etc.

TABLE 5

EFFECT OF TRIGGERING EVENT ON THE IDEA-GENERATED

Communication Channel	Number of Ideas Conceptual	 Procedural	Total
	Project A		
Literature	5.5*	15.5*	21
Interaction	3.0	15.0	18
Experiment and Analysis	3.5*	11.5*	15
No Specific Event	0	4	4
TOTAL	12	46	58 ψ = 1.68
	Project B		
Literature	3.5*	10.5*	14
Interaction	5.5*	2.5*	8
Experiment and Analysis	0	4	4
No Specific Event	0	2	2
TOTAL	9	19	28 ψ = 9.31

*Note : When an idea was associated with two trigger events each was assumed to have contributed half the idea. No case was encountered wherein more than 2 triggering events were involved.

3. PROBLEM SOLVING

In the persuit of technological innovations it is usual to encounter a range of problems. This stage comes, only after the information has been synthesized into an idea or design concept, and then concerned organization commits the desired funds to its development, then solving process begins. The problem-solving process normally consists of following steps:

i) Division of problem into separate subproblems;
ii) Setting specific technical goals;
iii) Assigning priorities to goals;
iv) Evaluating design alternatives using goals & priorities.

The problems that are normally encountered can be classified into different ways by different authors. One researcher classifies it as of four types : Conceptual —, relating to concepts; Empirical —, relating to data; Procedural —, relating to techniques and methods; and Logistics —, relating to supply of equipment, material, facilities, etc. Some classify it as technical and non-technical. According to Allen[18] in case of technical problem there is often no correct or even best solution in the long run. In fact, there is frequently no terminal state, both problems and solutions are themselves dynamic. Also the interaction of the researchers with the environment is continual and changing. The criteria for the evolution of potential solutions are not absolute-they are ultimately a matter of judgement and different people evaluate it differently. Basically we can see that resolution of a technical problem involves two stages : assembling of information; filtering and evaluation of information; and applying it at right time, context and situation.

3.1 Types, Sources and Channels of Information Used in Problem-Solving

3.11 Types of Information Used

As in earlier case, we will first analyse the types of information used in problem solving. Myers and Marquis[6] have identified 8 types of information used in problem solving as shown in Table 6. The data regarding properties, composition, characteristics of material has been used

TABLE 6

CONTENT OF INFORMATION USED DURING PROBLEM-SOLVING

Content or Nature	Total No.	 %
Properties, Composition, Characteristics of Materials or Components	238	28
Existence or Availability of Equipment or Materials with Particular Properties	123	15
Design Based Information	123	15
Text Procedure and Techniques	89	11
Operating Principles or Rules, Required Specifications, Technical Limitation	88	11
Location of Information	78	9
Theories, Law, General Principles	71	8
Existence of Specialist Facilities or Services	27	3

to the extent of 28%. The other important categories of information used were design-based information (15%) and text procedure and techniques (15%), etc.

3.12 Sources of Information

The solution of a problem needs a critical information which the scientists get from a variety of sources. The type of sources used during problem solving have been studied by a number of researchers, for example Johnston and Gibbons[19], Langrish et al[5], Myers and Marquis[6] have studied the comparative contribution of external, internal and personal sources in problem-solving as indicated in Table 7. According to them, internal sources play a more important role in problem-solving. Similar results are depicted by studies of Utterback[14] and Allen also. The Allen study reports that 80% of the information used in resolving technical problems was widely available, through perhaps only to specialists with the appropriate education and experience.

TABLE 7

SOURCES OF INFORMATION USED IN PROBLEM-SOLVING

General Source	Johnston & Gibbon	Langrish et al	Myers & Marquis
External	34	36	32
Internal	30	35	-
Personal	36	29	68

In another study, Allen[18] went a step further, where he tried to relate the source of information with the quality of solution to the problem to be solved. He considered a slightly higher proportion of 118 alternate solutions during problem-solving as suggested by external sources (62 cases; 52.5%). However, when one looks at the quality of accepted alternatives and their sources, their picture changes dramatically. 7 out of 8 accepted alternatives from internal sources resulting in higher rated solutions, while 9 out of 14 accepted alternatives from outside sources resulting in lower rated solutions. This shows that R&D teams which rely more heavily upon outside information sources were found to produce poorer quality solutions. So far we have studied the general sources of information by which the information was sub-divided according to whether the problem-solver obtained the information from sources within the company, or possessed the information himself. We will not focus at the specific sources of information used during problem-solving under the above categories of sources. Johnson[20] while studying chemical innovations in British industry has studied the sources of information during problem solving. The results of his study are presented in Table 8,9 which indicates that the major form of printed matter that contributed maximum scientific information to the resolution of technical problem was the primary and secondary scientific literature. This type of information made up of about 30% to the total scientific inputs and was also the third largest source from outside the company. Also the inputs obtained from the scientific literature mainly described either the

TABLE 8

SPECIFIC SOURCES OF INFORMATION USED IN PROBLEM-SOLVING

Number of Information Inputs

Outside Company	No.	%	Inside Company	No.	%
Trade Literature	43	14	Analysis & Experiment	183	69
Technical Literature	22	7	Superior	25	9
Scientific Literature	36	12	Colleague	17	6
Textbooks	8	2	Other Departments	17	6
Handbooks	20	7	Other Division	7	3
Representatives & Customers	20	7	Company Manual	9	3
Suppliers,Companies	39	13	Company Report	6	2
Universities	30	10	Internal Library or Reference System	3	1
Professional Institutes	3	1			
British Standards	12	4			
Exhibitions	2	1			
Consultants (Commercial)	12	4			
Government Agencies	11	4			
Field Tests	8	3			
Conferences	4	1			
Research Associations	24	8			
Patents	6	2			

properties, composition of characteristics of material and components or provided theories and general principles. The majority of the scientific literature used was in the form of reports of original research work. The other printed sources of scientific information inputs were textbooks describing scientific theories and principles, and scientific handbooks providing data and characteristics of fundamental or natural materials.

TABLE 9

DISTRIBUTION OF USE OF OUTSIDE COMPANY SOURCES

Source	Number of Innovations Having specified Number of Information Inputs							
	0	1	2	3	4	5	6	>6
Trade Literature	7	10	9	2	1	1	0	0
Technical Literature	18	5	4	3	0	0	0	0
Scientific Literature	20	5	0	1	0	0	3	1
Textbooks	26	2	0	2	0	0	0	0
Handbooks	18	6	4	2	0	0	0	0
Representatives & Customers	18	7	2	3	0	0	0	0
Supplier Companies	13	7	7	1	1	0	0	1
Universities	18	2	6	2	1	0	1	0
Consultants	24	3	1	1	1	0	0	0
Research Associations	25	2	0	0	0	1	1	1

The second vehicle of information transfer by means of printed matter was technical literature normally consisting of : articles of a technical periodical, advertisements of products and processes, etc. The major inputs as reported obtained from technical literature was of type of information such as properties, composition, characteristics of materials or components; existence or availability of equipment or materials; test procedures and techniques; and design-based information. By comparison the trade literature, disseminated by firms to provide information about their products in the form of catalogue, was the major single source of technical information from outside the company.

Contacts in industry such as sales representatives, customers, and the technical sales staff in supplier companies were one of the two major sources of technological information from outside the company and were used by vast majority of problem solvers.

Information was obtained from universities through a number of modes of interaction : occasionally by employing academic scientists directly as consultants and by supporting research in a university which was relevant to company interests, but more frequently by requesting advice and assistance, and by the use of special facilities such as instruments and libraries.

The research associations were another category of information source which provided the fifth highest number of information inputs. The type of information which this source provided was a mixture of S&T and involved the properties or characteristics of materials; design information; and the location of specific pieces of information.

Now going a step further, it will be interesting to know the impact of information from generated sources. This was well depicted by Johnson & Gibbons[19] and is presented in Table 10. The information obtained from outside the company contributed significantly more in providing the solution to technical problems than did the other categories. While sources outside the company contributed only about one-third of the information, they were by far the most important in resolving technical problems arising during innovations. Internal information had the greatest impact by stimulating action leading to a solution in which the information itself was not contained and by narrowing the possible area of solution i.e. information from within the company played the role of assisting the solution but did not provide the actual solution. Personal sources were used significantly more to obtain, which enabled the test of a proposed solution to be carried out, or defined the base parameters of a problem. Thus it appears that greater the "cognitive distance" between the problem-solver and the information he acquires, the more likely it is to contribute in a major way to the resolution of technical problem. While all sources of information are important, it is that information with which the problem solver is least familiar and which is least readily accessible to him at the commencement of innovation that in practice provides the greatest contribution to solving technical problems - a clear indication of the value of close links to sources of information outside the firm. A few studies have also been carried out which throw some light on the organizational size, newness of the requirements of the firms on the sources of information used. Another important element which has also been studied is the effect of the sources of information used on the routine contingency situation and non-routine and high pressure situation in problem solving.

TABLE 10

IMPACT OF INFORMATION FROM GENERAL SOURCES

Impact	General Sources External %	 Internal	 Personal %
Evoked basic idea	2	1	0
Provided or directly led to solution of problem being worked out	35	24	28
Stimulated action leading to the solution but was not itself incorporated	18	23	12
Narrowed area of solution of demonstrated feasibility	19	26	15
Defined base parameters to problems	6	13	16
Enabled test of proposed solution to be carried out	17	11	26
Contributed to unsatisfactory solution	3	2	3

In a study by Bodensteiner[21], the author has developed the concept that selection behaviour could be correlated with information uncertainty. His reasoning was based on two premises : (i) the more uncertain the individual is about needed information, the more tension he feels to seek additional information to reduce uncertainty; and (ii) when seeking additional information, the individual chooses from the variety of channels/sources with different information-carrying capacities and characteristics. The author also hypothesized that increased uncertainty (with consequent increased tension) would lead the individual to use channel/sources with increased information-carrying capacity and/or with increased opportunities for "personal" (socio-emotional support). He means job-related information transfer which could be arrayed on a single dimension of richness, combining a single concept of channel capacity with the concept of "impersonality" of information channel as seen in Fig.2. Another study by Holland et al[22] on the information source selection by R&D groups under conditions of technical uncertainty has used the above concept of "richness" to measure a source's degree of impersonality as well as the ability of an information source to utilise a variety of information codes (such as verbal/written modes, non-verbal information, etc). The study concludes that both in traditional and non-routine problem solvings, internal sources were more important than external sources. External sources, however, are relatively more important to non-routine problem-solving than they are to traditional R&D problem solving.

(a) Effect of Organizational Size on the Sources of Information

Organizational size is one of the organizational characteristics affecting information acquisition. The studies by Allen[23], Freeman[12], Shotwell[24] have shown that smaller firms exhibit

Fig. 2: Channel Characteristics and Richness of Four Means of Information Transfer

Means of Information Transfer	Channel Language	 Non-Language	 Feedback	Richness of Transfer Means
Formal Written Documents	Formal Vocabulary (Impersonally Addressed)		Slow	Lowest
Informal Letter/Memo Documents	Formal & Informal (Personally Addressed)		Slow	Low
Telephone Conversations	Formal & Informal Vocabulary (Personally Addressed)	Inflection, pauses	Fast	High
Face-to-Face Discussion	Formal & Informal Vocabulary (Personally Addressed)	Inflection pauses, Gestures, Expressions	Immediate	Highest

a substantially different behaviour pattern in acquiring technological information than do large firms. This is believed to be largely due to small firms being constrained by limited managerial resources and lack of antennas which can be used to identify and exploit relevant information sources.

(b) Newness of the Requirements

Another factor which could conceivably affect the firm's ability to acquire relevant technological information is the newness of the requirement themselves. Taylor and Utterback[25] in examining engineering groups faced with new tasks, found some significant changes in their information acquisition behaviour. As new technological problems are faced, the R&D Group may find itself relatively uninformed. It may also lack the linkages to the relevant external community which has been established for more traditional fields of technology.

3.13 Channels of Communication

The choice of information channel for problem-solving depends upon many factors e.g. nature of problem, accessibility of the channel used, and perceived pay-off from the channel. A few authors have studied the use pattern of various channel in the process of problem solving. Nagpal and Pruthi[17] have studied the use of various channel and its relation with the type of problem used. The results of the study are presented in Table 11. It is observed that about one fourth of the problems were solved through interaction in Project A and one third in Project B. It is difficult to speculate as to why in Project B, the role of interaction was pronounced than in Project A. The reason assigned to it is that project B is comparatively of recent origin and therefore needs more discussion for solution of problems. The author also tests whether there is any relation between type of problem solved & type of channel used. However, data do not lead to any conclusive results. Comparing the results of this study with that of Johnson & Gibbons[19], interaction was found to play a significant role in providing information during the process of problem solving in both the studies as seen in Table 12. Utterback also went further and presented a comparison of the use of communication channel during problem-solving for means versus need-stimulated innovations. His results are presented in Tables 13,14. It was assumed that channel use would differ after funding for means stimulated as opposed to need-stimulated ones. This assumption was based on the expectation that means-stimulated innovations involve more recent technical information than those stimulated by needs. The data presented in Table 12

TABLE 11

CHOICE OF COMMUNICATION CHANNEL USED FOR PROBLEM-SOLVING

Type of Channel	Conceptual	Number of Problems Solved		Total
		Empirical	Procedural	
Project A				
Literature	3.5*	1	8.5*	13
Interaction	1.5*	0	9.5*	11
Experimentation/ Analysis	1	2	11	14
Unspecified	1	0	3	4
TOTAL	7	3	32	42
Project B				
Literature	1	0	9	9
Interaction	0	0	10	10
Experimentation/ Analysis	0	1	6	7
Unspecified	1	0	3	4
TOTAL	2	1	28	30

*Note : In those cases where two channels were simultaneously used, half the problem solved was attributed to each channel. That is why fractions occur in the table. No case was encountered wherein more than two channels were used.

TABLE 12

ROLE OF DIFFERENT CHANNELS USED IN PROBLEM - SOLVING

Type of Channel	Percentage of Problems Solved	
	Nagpal & Pruthi	Johnston & Gibbon
Literature	29.5	29
Interaction	33.3	37
Experiment & Analysis	26.9	34
Unspecified	10.3	-
TOTAL	100	100

TABLE 13

ANALYSIS OF TRANSITION IN CHANNEL USAGE IN PROBLEM-SOLVING PRIOR AND FOLLOWING FUNDING

Sources of Initial Input (i) in Each Pair Prior to Funding	Source of Subsequent Input (i+1) in Each Pair		
	Literature & Experience	Discussion	Analysis and Experiment
Literature and Experience	9	10	7
Discussion	10	28	11
Analysis & Experiment	6	9	8

Sources of Initial Input (i) in Each Pair following Funding	Sources of subsequent input (i+1) in Each Pair		
Literature and Experience	2	6	6
Discussion	3	8	12
Analysis & Experiment	2	8	17

indicate that greater proportion of communication inputs for mean's-stimulated innovations came from the literature and technical contacts outside the organization than was the case of need-stimulated innovations. Utterback[14] has also provided the analysis of transition in channel usage in problem solving prior and following funding. His results are presented in Table 11. Normally it is generally assumed that during problem solving, search for information will proceed from available information (literature-memory) to secondary sources (discussion) and to primary sources (Analysis-Experiment).

4. IMPLEMENTATION AND DIFFUSION

Implementation refers to the manufacturing, engineering, tooling and plant start up required to bring the prototype solution, or invention to its first use (process) or market introduction (product). While this subprocess generally involves greater expenditure and commitment by the firm than both idea-generation and problem-solving, the technical uncertainties involved are those to be less than those in the earlier phases. Once the first use or introduction of a process or product occurs, the technical process of innovation ends and an economic process of testing, acceptance, and communication begins. Diffusion is considered to be a two-step or multi-step process. It begins slowly with the product or process being employed by a few influential economic innovators or opinion leaders. Then the research is communicated and diffused to the rest of the population. Using Rogers[25] framework the diffusion of an innovation may be defined as "The process of adoption or rejection, over time, of some specific idea or practice, connected to specific channels of communication which may be complementary to social structures and to a given system of values and cultures". Mansfield[27] selects four major factors which appear to govern the rate at which an innovation reaches an equilibrium level of use. These are : the extent of economic advantage of the innovation over existing methods or products; (ii) the extent of uncertainty associated with using the innovation when it first appears; (iii) the extent of commitment required to try out the innovation; and (iv) the rate of reduction of the initial uncertainty regarding the performance of the innovations. The availability of information on each of these factors can accelerate arriving at a decision about the adoption of a technology by a target system.

Rogers[25] uses a five stage model to characterize the adoption process : awareness; interest; evaluation; trial; and adoption.

4.11 Sources of Information Used During Diffusion Process

Most of the debate on the use of information sources has been concentrated on two dimensions. The first dimension is the personal-impersonal category which refers to obtaining information from people as opposed to written material. The second dimension is the external-internal category which distinguishes sources inside the organization or group from outside sources. Using Rogers model, Churchill and Ozonne[28] and Warner[29] have studied the contribution of various information source at each stage in the diffusion process of innovations. It has been reported that impersonal, external sources of information were found more important during the awareness stage. In contrast, personal and external sources were paramount during the interest stage, impersonal sources were utilized most during the evaluation stage. Also at the evaluation stage, greatest variety of information sources are employed.

TABLE 14

COMPARISON OF THE USE OF COMMUNICATION CHANNELS DURING PROBLEM-SOLVING FOR MEANS-VERSUS NEED-STIMULATED INNOVATIONS

Channel of Communication used	Means-Stimulated Innovations	Need-Stimulated Innovations	
Prior to Funding			
Literature & Technical Consultation Outside the Organisation	15	34	$X^2 = 1.214$
Other Sources	17	66	p = 0.270
Following Funding			
Literature & Technical Consultation Outside the Organization	14	26	$X^2 = 4.012$
Other Sources	18	84	p = 0.045
In Total			
Literature & Technical Consultation Outside the Organization	29	60	$X^2 = 5.528$
Other Sources	35	150	p = 0.019

In a similar type of study in the field of agriculture, it was found that the prevailing culture of their communities was found to influence the rate of diffusion of information and differential use of communication channels among farmers. The use varied in relation to the stage in the adoption process that the farmer has used and in relation to the farmer's adopted category. For example, mass media sources were important at the awareness and interest stage; neighbours and friends were important at the evaluation and trial stage, etc.

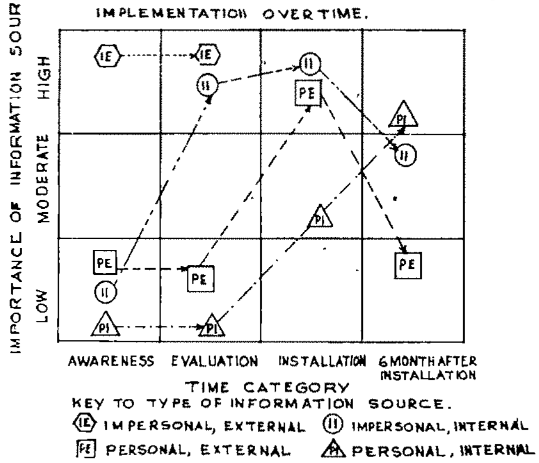
Ettlie[30] has also studied the use of specific sources at the first stage of adoption process. According to him six different sources of information were mentioned as contributing to the awareness stage of the adoption process of the technology studied : (i) machine tool shows or expositions; (ii) trade journals; (iii) original manufacturers or source organizations; (iv) distributors; (v) other organizations already using the technology, and (vi) consultants. Among these, the most important sources of information contributing to awareness of technology were trade journals (25%), machine tool shows (20%) and distributors (20%). In fact, similar sources were found important or rated high by Warner study also. Now it will be more interesting and useful, if we relate the sources of information used at each stage to the eventual pattern of successful utilization of technology being adopted. This has been studied by Ettlie.[31] The major findings of his study is as follows.

(i) Impersonal, external sources of information are most likely to be used at the awareness stage Also there is no apparent relationship between the variety of information source or the dominance of either personal or impersonal information sources to the awareness stage and the ultimate utilization rate attained by the adopters. The pattern of information usage during the early adoption phases does not appear to be a reliable predictor of utilization;

(ii) The inclusion of impersonal information sources during the evaluation stage of adoption results in higher utilization rate in organizations which implemented the production innovations. There is also some indication that the variety of information sources used during the evaluation period is greater than those during any of the other four stages. This indicates that both external and internal sources of information are important during evaluation;

(iii) During the first six months of implementation there is an increasing dependence on inter-

FIG. 3: EMPIRICAL MODEL OF THE IMPORTANCE OF INFORMATION SOURCES AND SUCCESSFUL IMPLEMENTATION OVER TIME.



nal, personal sources of information and, to a lesser extent, a sharp increase in internal, impersonal information sources. These latter sources gradually become less important by the end of six months. During the same period of time, external, personal sources of information become less important to user organization. This pattern of information usage corresponds with the higher utilization rates eventually attained by some user organizations of these production innovations.

The above emergent pattern of information usage and successful implementation is also summarized graphically in Fig.3.

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ROLE OF INFORMATION IN TECHNOLOGY TRANSFER : A CASE STUDY OF CENTRAL BUILDING RESEARCH INSTITUTE, ROORKEE

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Discusses different processes developed by C.B.R.I., Roorkee, which have been transferred to the various organisations engaged in construction work. Suggests a national information system for transfer of technologies at all levels Explains the role of documentation, information services and suggests a network for transferring technology in an effective way.

0. INTRODUCTION

No nation, whether undeveloped, developing or developed, can ever claim the self-sufficiency in the areas of scientific, technical and industrial progress. These nations have to look for co-operation in the fields of science, technology and industry. Self-sufficiency and perfectness in every respect is merely a theoretical concept. Co-operation in these fields can only be obtained through a process of technology transfer. The idea behind this concept is, that through transfer of technical results and technical 'know-how',the developing, underdeveloped and advanced countries can make progress. But this can only be possible if the developed nations stop their race for supremacy and start cooperating with each other. It requires a systematic and well-knit network at local, national and international levels. This will further help in avoiding duplication of work in technological advancement.

1. TECHNOLOGY TRANSFER OF APPROPRIATE TECHNOLOGY

Technology indeed plays a notable role in harnessing the natural and human resources of the nations. For technology to be productive, it should be capable of being absorbed in the general economic structure, adopted and further developed by local talent to suit local conditions and available sources. It has now been well realised that indiscriminate and repetitive import of technology is not only expensive but also not rewarding. Under the circumstances the concept of Appropriate Technology has emerged. A growing number of development experts and national policy makers are beginning to question the wisdom of massive technology transfers from the industrialised countries to the developing countries.

The large scale capital intensive technology developed in Europe, North America or Jqpan may well be very efficient, but their introduction in poor, less developed societies often raises more problems than they can solve. They are usually very costly relative to the income of the local population, they require an educational and industrial infrastructure which takes decades to build up, their disruptive social consequences tend to be much more sudden than in their culture of origin. But perhaps most important of all, their introduction often inhibits the growth of the indigeneous innovative capabilities which are necessary if "development" is to take place, as development is a complex social process which rests in large part upon the internal innovative capabilities of a society. Import of foreign ideas, values and technologies have a major part to play, but few societies in history have developed exclusively on the basis of such imports. One of the major tasks facing the developing countries is to create, nurture and more often than not rehabilitate their internal capacity to invent and innovate. As far as technology is concerned, this implies not only a much greater selectivity in the choice of imported equipment, plants and methods of production, but also--and this is much more important-- the invention and diffusion of new types of technology and new forms of organisation which are better suited to local conditions.

The technologies which meet this requirement are variously described as 'appropriate', 'low-cost' or 'intermediate'. The Appropriate Technology first and foremost be an indegeneous creation of the developing countries themselves, and the central problems they have to face is that of building up of an indegeneous innovations capability and not that of importing more foreign technology. India is a vast country which is full of natural resources, rich minerals which are yet to be exploited for the industrial and economic development of our country. This cannot be achieved single-handed and requires cooperative efforts through various organisations engaged in scientific, technical and industrial research at private as well as Government level.

2. CBRI - A TECHNOLOGY GENERATOR

The Central Building Research Institute, Roorkee, India, a national laboratory under the Council of Scientific and Industrial Research (India), is a unique institute carrying out research on various aspects of building research. To state it somewhat differently, it is a body for the generation of science and technology for industrial application particularly in the area of building research. Perhaps there is no parallel to it in the country in terms of its very wide and diverse coverage of scientific and technical fields. It provides means for working of well identified programmes (research projects) towards definite goals, while at the same time it permits ample and free thinking and encourages exploitation of such thoughts and ideas as are likely to generate techno-economic benefits.

It is an organisation which is helping the construction industry of India. The construction industry is distinguished by, inter alia, a larger variety of disciplines than most other industries. Housing is an activity of construction industry. Its progress can only be judged by the number of organisations engaged in research activities. Some of the main organisations are: National Building Organisation; Structural Engineering Research Centre; Cement Research Institute etc. These organisations also generate lot of technologies. Merely generating the technology at the laboratory level and then leaving the result untapped is a criminal waste of time, money and energy and is a social injustice. These results must be brought to the notice of the various industries engaged in the field so that these may be tested and fully utilised. This can only be achieved through the process of transferring the technology through the channels of information.

3. LANGUAGE OF TRANSFER OF TECHNOLOGY

The language of transfer of technology is the information which is available in the form of articles published in current periodicals. Papers discussed in national and international conferences, translations of documents from other foreign languages etc. The role of information is vital. Information problems and means to solve them are currently troubling the researchers engaged in the building research activities, firms and authorities concerned with building in a number of countries. This is due to the exponential growth of information in a Geometrical Progression. There is a communication gap, that is one of the alarming factors, which hampers the smooth flow of information.

Information collection and retrieval has a very significant role in any service or commercial enterprise. Unless organised channels are available for this purpose excellent exercises would remain unnoticed and wasteful repetition would unnecessarily consume precious engergies. There is a need for more sophisticated tools for formulating information systems and requirements.

Central Building Research Institute,Roorkee is also transforming its results through various processes, which are discussed in the form of current articles published in Indian and foreign journals, presentation of papers at national and international symposia, bringing out building digests, building material notes, technical notes information notes and by patenting its processes and then issuing licences to various licencees working in the field of building research (see Annexures).

Building Digests are short notes giving available information on a particular new/ improved building material, technique, system, process or equipment.

Building Material Notes, however, are restricted to information on building materials only and mainly report the research work of the Institute.

Technical Notes give similar information on topics other than building materials.

Data Sheets give information about a new CBRI construction technique in a well-illustrated and descriptive form and are meant mainly for the field engineers/architects.

Information Notes are generally meant to give preliminary information relevant to some Data Sheet.

Project Proposals give detailed information about a project and are useful to entrepreneurs who may like to take up a CBRI new/improved building material technique, system, process and equipment for commercial exploitation.

The information for transfer of technology is generated by the following divisions of the Institute.

1. Building Material Division (B.M.)
2. Building Process, Plant & Productivity Division (B.P.P.P.)

3. Efficiency of Buildings (E.B.)
4. Education and Health Buildings (E.& H.B.)
5. Fire Research Division (F.R.)
6. Housing & Planning Division (H & P)
7. Information Division (Inf.)
8. Rural Building & Environment Division (R.B.& E.)
9. Soil Engineering Division (S.E.)
10. Experimental & Construction Division (E.& C.) (Annexures)

These divisions develop various processes by taking up different projects on the request of industries involved in the construction activities. The institute takes up consultancy as well as sponsoring projects implementing CBRI techniques. (Annexure)

Various channels are adopted in developing the processes. The following are some of the channels:-

> Colloquia: These are held weekly wherein the problems are discussed before selected gathering of the Institute and it is critically examined by the fellow-scientists, the suggestions offered are incorporated in the project to make it more scientific.
>
> Project Evaluation: These meetings take place daily. The days are allotted to different divisions. In these project evaluation meetings the progress of the project is watched and if some problem is there, the same is discussed and the methods to improve it are suggested.
>
> Get-to-gethers: Get-to-gethers coupled with exhibitions are arranged at different places wherein all industries are invited to discuss the problems pertaining to their fields and through exhibits the models are displayed. The lectures by the scientists concerned are arranged to make them aware of the activities of the Institute. The problems pointed out by the industrialists are discussed and taken into account while taking up similar projects in future.

4. EXTERNAL AGENCIES

Apart from the Institute's activities at Roorkee, five extension cells at Ahmedabad, Bhopal, Calcutta, New Delhi and Hyderabad are helping in disseminating information on the processes of the Institute by arranging seminars, lectures, exhibitions etc. (Annexure).

5. NATIONAL RESEARCH DEVELOPMENT CORPORATION OF INDIA (N.R.D.C.)

N.R.D.C., New Delhi gets patents and 'know-how' from all the public sector R & D institutions, including CBRI, some private organisations and individual inventors. The 'know-how' is released to industry on payment of premium and royalty on sales.

The N.R.D.C., has already licenced about 1000 technologies for commercial exploitation. Over 400 units have been established in the country based on the 'know-how' licenced by the N.R.D.C.

6. PATENTS OFFICE OF INDIA

The various processes invented by the scientists of the Institute are filed for patenting with the Patents Office of India. After some time the patents are sealed and accepted for commercial exploitations. (Annexure).

7. LICENSING TO THE INDUSTRY

Once the process is developed and tested in the laboratory, the same is passed on to the industry after granting them licence for exploitation in construction industry.

8. NETWORK OF TRANSFER TECHNOLOGY

A systematic network is required for the smooth transferring of the technology at the regional, national and international levels. In the area of building research, the models developed by National Information System for Science and Technology (NISSAT) may be adopted on the basis of different sectors such as drug, petroleum, leather, housing etc.

9. REGIONAL CENTRE FOR TECHNOLOGY TRANSFER

A Regional Centre for Technology Transfer (RCTT) under the Economic and Social Commission for Asia and the Pacific (ESCAP) has been established at Bangalore which will be looking into the activities of transfer of technology. The Centre was set up in July 1977 as a result of a unique initiative on the part of the ESCAP and the countries of the region. The Centre was conceived on a network principle with intimate links to national centres and institutions of excellence in the countries of the region, for assisting them in the development and transfer of technologies relevant to development, and in general cater to the needs of the countries in the areas of science, technology and technology development and transfer.

In line with this basic aim, RCTT's objectives include assisting countries in the

ESCAP region in strengthening their national capabilities in the field of technology development and its transfer initiating cooperative programmes among countries in the region for the development and utilisation of technologies of mutual interest; assisting national centres in technology assessment and evaluation; helping participating countries in identifying appropriate technologies, supply of relevant information to national centres and countries, delivery of information services, unpackaging of technologies in use or those sought to be acquired; assistance in negotiations for best terms while purchasing technologies; assistance in indigenisation, absorption and development of imported technologies; and instituting training programmes to help train personnel from countries in the region in the area of technology development and transfer.

10. NEED FOR CODE ON TRANSFER OF TECHNOLOGY

The United Nations Conference on Trade and Development (UNCTAD) is working on a code of conduct which would benefit both the developed and the developing countries in transfer of technology. Many of the developing countries might have to cut their plans on development due to absence of a solution to their balance of payment problem. By this way the developing countries might be able to enjoy better terms in a new system of trade preferences among the developing countries in the establishment of multi-national marketing and production enterprises and bringing together the State Trading Corporations of developing countries.

11. ACKNOWLEDGEMENT

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ANNEXURES

CONSULTANCY AND SPONSORED PROJECTS (1978-79)

Year	CONSULTANCY PROJECTS								SPONSORED PROJECTS							
	BM	SE	EB	BPPP	E&C	APP	FR	RB	BM	SE	EB	BPPP	E&C	FR	APP	RB
1978	12	14	4	6	3	-	-	-	12	3	1	-	-	1	8	-
1979	18	17	5	6	6	-	-	-	6	1	11	-	-	1	7	1

NB: Abbreviations stand for Divisiosn of CBRI which have been given in the text.

TECHNICAL ENQUIRIES (1978-79)

Year	No.of Enquiries replied
1978	3,200
1979	3,300

ARTICLES PUBLISHED BY CBRI (1978 - 79)

Year	BM	SE	EB	BPPP	APP	FR	RBE	E&C	Inf	Hindi Paper
1	2	3	4	5	6	7	8	9	10	11
1978	8	8	8	8	6	2	4	1	5	3
1979	23	B	11	5	4	-	1	4	6	5

COLLOQUIUM HELD AT CBRI (1978-79)

Year	BM	SE	EB	BPPP	APP	FR	RB&E	E&C	Inf	in Hindi
1	2	3	4	5	6	7	8	9	10	11
1978	10	5	3	6	5	2	3	3	1	12
1979	8	5	5	7	2	4	1	4	1	6

TECHNICAL TRANSLATIONS DONE AT CBRI (1978-79)

Year	French to English	German to English
1	2	3
1978	2	3
1979	-	2

INTERNATIONAL COLLABORATIONS (1978-79)

Year	Deputation Abroad	Guest Scientists	Nominations India	Nominations Abroad
1978	6	1	-	4
1979	7	3	-	3

Source: CBRI Annual Reports for 1978 & 1979

SCIENTIFIC VISITORS TO CBRI (1978-79)

Year	Visitors Foreign	Visitors Indian	Special Lectures	Field of Subject BM	SE	EB	BPPP	APP	FR	RB	E&C	Inf
1	2	3	4	5	6	7	8	9	10	11	12	13
1978	11	3	2	-	1	-	1	-	-	-	-	-
1979	12	4	15	5	5	-	5	2	-	-	-	-

PATENTS & PROCESSES (1978-79)

Year	Processes developed	Processes licensed to industry	Patents Filed	Patents Sealed	Exhibitions	Publicity Radio	Publicity TV	Publicity Press	Get-together
1978	12	14	1	3	6	5	6	5	2
1979	5	14	2	1	12	5	14	-	3

Source: CBRI Annual Reports for 1978 and 1979.

CBRI PUBLICATIONS (1978-79)

Year	Building Digests	Building Material Notes	Information Notes	Data Sheets	Technical Notes	Process Literature	Circulation
1978	6	3	1	-	5	8	300
1979	7	5	1	-	1	10	400

Source: CBRI Annual Reports for 1978 and 1979.

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DESIGN OF A COMPUTERISED DOCUMENT HANDLING SYSTEM FOR A GROUP OF LIBRARIES

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Describes the salient features of a pilot project on the establishment of a computerised document handling system covering the resources of the Institute of Armament Technology, and other sister establishments in the Defence Research and Development Organisation. Discusses the problems involved in the system design, particularly relating to subject indexing. On the completion of the pilot project, the system has been established for Poona based establishments, and is working satisfactorily for the past two years. The system is based on batch processing and now efforts are being made to convert it into on-line.

1. INTRODUCTION

Providing subject and author access to non-book materials, particularly reports, acquired by the Institute of Armament Technology Library, Pune (IAT) was posing a serious problem. The only practical solution to this seemed to go in for computerization. Added to this is the growing demand for inter-library loan of books and reports. The lack of a union catalogue of books necessitates frequent enquiries many of which turn out to be infructuous. This too strengthened the case for computerizing all our library resources. Hence, a decision was taken to initiate a Pilot Project (PP) to computerize our library resources. It was at this stage that the idea of extending the programme to the resources of the whole of Defence R&D Organizations (DRDO) was conceived and thereby the concept of a National Defence Science Information System originated.

2. EXISTING MANUAL PROCEDURE

Manual procedure at IAT, consists of classifying all documents whether books or reports by UDC; preparing catalogue entries on 5"X3" cards under author, class number and sometimes under title. These cards are filed under separate author and class number sequences. Subject access to the documents is through an index to UDC class numbers.

3. JUSTIFICATION FOR COMPUTER PROCESSING

The manual system is cumbersome, up-dating is tedious, providing accurate and exhaustive subject access particularly to reports has become difficult, searching catalogue is time-consuming and needs thorough acquaintance on the part of the user. Computer processing overcomes some of these defects and in addition can generate numerous output records as per our requirements. Another important factor is that integration of document records from different establishments and laboratories within the group. (E/L) is practicable only by computer processing.

4. SYSTEM DESIGN

Design work was started after carefully deciding the functions of the desired system, study of each component of the system and their inter-action. After this, the work of designing each part and their integration was taken up.

5. CONSTRAINTS

Due to lack of on-line computer facilities, the entire PP is based on batch processing. The limited man-power available to us forced us to restrict the system design to books, proceedings of symposia and conferences (PSCs) and report literature. These constraints and other technical difficulties to be discussed later have also dictated against providing the basic output record covering both books and reports in a single sequence.

6. FUNCTIONS OF THE DESIRED SYSTEM

The following functions are to be fulfilled by the system:-

(a) List and display all documents in the system alongwith their location;

(b) Retrieve documents from the system by author, subject, title and other required approaches; and

(c) Answer a specific query pertaining to an author, subject, title or other related features.

7. COMPONENTS OF THE SYSTEM

An information system essentially consists of storing of information about documents (or information itself) and their coding* through an index language so that the required documents or the information contained in them is retrieved when called for. The three major components of an information system are:-

(a) Input. This consists of books, PSCs, reports, patents and such other materials in the system along with their bibliographic description.

(b) Output. These may comprise lists of items on a given subject, author, title and other desired requirements with or without full bibliographic description. It may also consist of the actual information in the form of words, figures, abstracts and extracts.

(c) Processing. This includes analysis and display of input data as to their subject contents, author, title and form, and coding these features to enable us to retrieve later the desired information as output.

INPUT DESIGN

8. SELECTION OF INPUT DOCUMENTS

Books, reports and PSCs acquired during the months of October to December 1978 by the IAT library were taken to form the input documents. These were about 100. In order to enable us to test the resilence of the system to cope up with the NADSIS requirement about 60 documents were selected from the monthly accession lists of other sister establishments. Out of these 160 entries, a final selection of 80 entries for books, PSCs and 40 entries for reports was made. These entries formed a representative sample of documents as well as E/L features that the system has to cope up with.

9. ACCESS TO DOCUMENTS

Holdings. The location of documents within the system and also holdings is indicated by following a three lettered symbol for each E/L. In order to facilitate first location within the same city, the E/L are arranged first according to the initial letter of the city or town where they are located. The other two letters are taken from the name of the E/L so that, by and large, the three letters easily identify the E/L where a given documents is available. Thus,

PAR stands for Pune, Armament Research & Development Establishment;

PER stands for Pune, Explosive Research & Development Laboratory;

PIA stands for Pune, Institute of Armament Technology; and

PRD stands for Pune, Research & Development Establishment (Engineers).

10. IDENTIFICATION OF A BOOK WITHIN E/L.

The surest way of identifying a document in an E/L is by its accession number. However, for books, the accession number is not included for the reason that the class number (UDC) and the author's name generally provide sufficient identification. This exclusion does not affect very much their easy identification, but reduces space. Another important reason for this is that generally libraries have a better bibliographic control over books than on reports and other non-book materials.

11. IDENTIFICATION OF A REPORT

Accession number is provided for each report for its identification within E/L.

DATA ELEMENTS AND DOCUMENT DESCRIPTION FOR COMPUTER PROCESSING

12. DATA ELEMENTS

The ISBD format recommends all data elements that can be associated with a document. All data elements listed in ISBD are not relevant to our purpose.

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* The coding here refers to classification and indexing techniques as different from that of coding for computer manipulation.

P3423

13. CRITERIA OF SELECTION

Data elements have been selected keeping in view that they:-

- (a) Keep the number of cards to be punched per item to the minimum;
- (b) Cover all elements that are basic and common to other E/L and
- (c) Help achieve maximum uniformity.

14. PROBLEMS IN CHOOSING DATA ELEMENTS

The accession lists issued by the various E/L were examined for selecting data elements. Besides these lists, various publishers' catalogues for books, bibliographic publications for reports such as US Govt. Reports Announcement, R&D Abstracts (U.K.), and a few representative reports, were studied. The relative importance of a given data element varied very much depending on the nature of publication i.e. book, report, specification, etc. This also influenced in deciding separate sequences for books and reports.

15. NON-UNIFORMITIES

There is no uniformity amongst the E/L in the selection and representation of data elements. Similar is the case regarding the identification of entry element, form of author representation, indication of imprint, collation and method of abbreviation.

16. SELECTED DATA ELEMENTS AND FIELD ORGANIZATION

Selected data elements, field organization and their tags are given in Appendix 'B'.

17. SUBJECT DESCRIPTION

Lately, there is a trend to indicate the subject contents of a document as a part of document description. This is done by providing key words or descriptors. Provision has been made for including descriptors for reports. The use of this field will remain restricted as many E/L do not provide descriptors.

18. OUTPUT RECORDS AND THEIR DESIGN

From the input data fed to and stored in the computer, a large number of output records corresponding to each category of data element or a combination of them can be generated. Apart from the consideration of computer time and cost of stationery, utility of many of these outputs (for example price-wise listing, edition-wise listing) will be of no practical use. A study of the requirements of users, librarians and managers showed that we need to have outputs which are primary and those that are desirable or secondary.

19. PROGRAMMED PRIMARY OUTPUTS FOR BOOKS

For books and PSCs the following outputs have been designed:-

- (a) Main record of items arranged under UDC numbers;
- (b) Subject key to main record; and
- (c) Title listing under authors.

20. MAIN RECORD

This forms the basic record to which all other output records are linked. Since this record is also to serve as a current awareness service, format design needed careful attention. The requirements are elegant display of items, direct approach and easy identification.

21. SUBJECT KEY TO MAIN RECORD

This is an alphabetical listing of subject headings appearing in the main record and the corresponding UDC numbers. Thus, it directs to the location i.e. class number under which all books and PSCs pertaining to a specific subject can be found. For works dealing with more than one subject, the index terms are reversed retaining the same sequence of UDC numbers so that false searches are avoided.

22. TITLE LISTING UNDER AUTHORS

In the initial programming the author was referred to the serial number in the main record. This involved unavoidable reference to the main record every time a given author and his work is to be identified. It was also felt that a title index is of very limited use. Hence, the author index was redesigned to form author listing of titles.

23. SECONDARY OUTPUTS FOR BOOKS

Outline of UDC Numbers. This gives a broad outline of the UDC numbers and the subjects they represent. Apart from providing us a bird's eye-view of the subject arrangement followed, it also serves as a broad entry point to the main record.

24. OTHER OUTPUTS

Additional listings of series titles, PSCs, can be generated by suitable modifications to the programming, if desired.

25. PROGRAMMED PRIMARY OUTPUTS FOR REPORTS

For reports the following primary outputs have been designed:-

(a) Main record of reports;

(b) Cyclic index; and

(c) Index to corporate authors.

26. MAIN RECORD OF REPORTS

In this, the items are arranged according to the COSATI list of subject categories, under the name of corporate author responsible, and then numbered serially.

27. CYCLIC INDEX

This forms the subject key to the reports listed in the main record.

28. INDEX TO AUTHORS

Unlike author index to books, corporate as well as personal author indexes to reports refer to serial number of the item in the main record. This is because the titles for reports are too long to represent economically.

29. SECONDARY OUTPUTS

Secondary outputs such as report number index, contract number index are feasible to generate. Programmes have not yet been designed.

30. UP-DATING OF OUTPUT RECORDS

The information stored in the computer memory should always remain up-to-date and current, but the difficulty is in deciding to what extent the printed outputs should cover the previous data. All primary outputs are to be issued once a month, with annual cumulated issues.

SUBJECT ANALYSIS OF DOCUMENTS AND THEIR REPRESENTATION

31. REPRESENTATION OF SUBJECT

The third and the most important area of system design relates to subject analysis of documents and their representation. The process of indexing consists of analysing the contents of a given document and then selecting or deriving a term or terms to correctly express the subject. Selection of terms and the arrangement of entries i.e. display depend on the method of indexing we wish to follow.

32. FUNCTIONS OF SUBJECT INDEXING

Its primary function is to provide a mechanism by which retrieval of information already stored is made possible; in other words it is to serve as a key to the subjects represented by documents. Its other function is to bring together all entries for documents in the system having the same subject.

33. POLICY FRAMEWORK

As a general policy it was decided that the PP should follow the indexing done by the IAT library and other E/L rather than itself doing it. Only in case where the indexing system followed by an E/L fails to achieve the objectives, we are to take recourse to conversion.

34. DESIGN CONSIDERATIONS

For the purpose of design, the whole area of subject representation may be divided into two sub-areas, namely, display of entries, and retrieval mechanism or subject indexing proper.

35. SUBJECT DISPLAY OF ENTRIES IN MAIN RECORDS/STORAGE

An hierarchical scheme of classification alone can display related documents together.

36. ARRANGEMENT OF BOOKS

IAT library and the other E/L included in the PP use UDC for books as well as reports. UDC being a hierarchical scheme brings associated documents together. Hence, UDC is retained for books.

37. PROBLEMS IN USING UDC

There are problems in using UDC even for books, mainly relating to:-

(a) Different E/L giving different class numbers for the same document or for documents dealing with the same subject;

(b) Documents being classified not to the same depth by every E/L; and

(c) The use of different terminologies for the same class number. This arises because:-

(i) Many terms given in the UDC schedule are imprecise or out-dated, but still followed;

(ii) Some E/L go in for comprehensive terms or current terms; and

(iii) A few E/L coin their own terms.

38. OVERCOMING OF PROBLEMS

These problems are overcome at the time of editing and also by following a standard practice for all E/L. Problems arising out of situations dictated by local requirements are overcome by incorporating suitable instructions in the programming.

39. ARRANGEMENT OF REPORTS

UDC. When applied to reports, the UDC seems very much inadequate due to the structure of the scheme and the very nature of a report. These are:-

(a) The subject matter of a report is generally more intensive in scope as compared to a book; and

(b) Reports are much more multi-disciplinary in nature and hence involve complex paradigmatic and syntagmatic relationships.

Since UDC was ruled out, we had to choose either thesaurus terms or Broad category of subjects for arrangement.

40. THESAURUS APPROACH.

A thesaurus will distribute the entries over a large area rather than bring them together. At present, except for Thesaurus of Scientific and Technical Terms (TEST) and the General Electric Company's (GEC) thesaurus there is no other thesaurus which meets our requirements. Construction of a new one is time consuming, besides requiring in-depth study and participation of all users. In addition, the use of a thesaurus uniformly by different E/L in the system requires a very high degree of co-ordination and subject involvement on the part of all E/L. This leaves us with Broad categories.

41. COSATI CATEGORIES

In a Broad Category approach the entire field of science and technology is divided into several main groups and each main group is further subdivided into sub-groups. A document will be listed under the approapriate main group/sub-group. The advantages of using Broad categories are:-

(a) It is easier to list all reports under broad subject heads;

(b) Broad category approach is followed by many international systems;

(c) A ready made grouping of subjects issued by the Committee on Scientific and Technical Information (COSATI), USA is available in COSATI List of Subject Categories; and

(d) COSATI covers the field of science and technology fairly well.

Thus, we could readily employ COSATI categories for listing reports.

42. SUBJECT INDEXING PROPER

Apart from author approach, the most important approach to information is through the subjects; thus the design of subject index is crucial to the success of the system. Here, we have a choice between post-coordinate and pre-coordinate systems.

43. SUBJECT INDEXING OF BOOKS

For the reasons mentioned earlier, we have selected UDC, a pre-coordinate device for subject indexing of books, monographs and PSCs.

44. SUBJECT INDEXING OF REPORTS

For reports, it was found that neither a classification scheme nor a thesaurus will suit our needs stated earlier. Thus, we had to think of a title based subject index. Of the Key-Word In Context (KWIC), Key-Word Out of Context (KWOC) and Cyclic index concepts, all of which can be generated by computer manipulation of titles, Cyclic index has been selected, as it is easy to operate and simple to understand.

45. CYCLIC INDEX

In a given title the words representing the subject are first selected. Then each subject word and the portion of the title following the subject word are fully copied. This is followed by a full stop(.) and the portion of the title that falls prior to the subject word is also copied after the full stop. Thus, the subject index consists of cycling the title around the subject word, thereby creating as many index entries as there are subject words.

In the following example, the title "Simplified loading formulae for pullout manoeuvres of tailed aeroplanes" will have 3 index entries as follows:-

(a) Loading formulae for pull-out manoeuvres of tailed aeroplanes. Simplified;

(b) Pull-out manoeuvres of tailed aeroplanes. Simplified loading formulae for; and

(c) Aeroplanes. Simplified loading formulae for pull-out manoeuvres of tailed aeroplanes.

46. DISADVANTAGES OF CYCLIC INDEX

Any natural language based index whether KWIC or Cyclic have the following disadvantages:-

(a) Inter-relationship of subjects are ignored;

(b) Introduces inconsistencies due to lack of vocabulary control;

(c) Does not solve problems created by synonyms and acronyms; and

(d) Excludes subjects when the concerned subject word do not form a part of the title.

However the advantages of cyclic index far outweigh its deficiencies. The PP recognises these problems and some of these can be solved by building appropriate guides and instructions in the programming.

CONDUCT OF PILOT PROJECT

LITERATURE SEARCH

Before the PP was initiated, a literature search was made to see whether we could benefit from earlier experiments. Except for a project initiated by INSDOC around 1965, no work similar to the PP seems to have been undertaken within the country. Computerized systems found in BARC (Bombay), TIFR (Bombay) and IIT (Madras) belong to different categories.

INSDOC EXPERIMENT

No published account of it is available. It was a failure. The main reasons for the failure seem to be that:-

(a) It did not cover reports and other non-book literature, the coverage of which is more important than books;

(b) It was a piece-meal approach, without appreciating the wider role of information in the over-all context of a national information system;

(c) The emphasis was more on the union catalogue aspect than on current awareness;

(d) It resulted in a printed catalogue which gave the impression of freeze rather than a current and continuing service and thereby making it uneconomical;

(e) Final users of the output did not constitute a group with inter-dependent or shared subject interest; and

(f) The awareness which we find to-day on the need for an efficient information system was not there.

Apart from this unpublished account of a part experiment, there was nothing that we could trace. Hence, we had to initiate the PP on our own without access to previous experience.

APPROACH TO PP

One of the initial decisions on the PP was that the project must entirely depend upon the resources of IAT, regarding both manpower and technical ability. It was also decided that the emphasis should be on results rather than perfection. Except for computer facilities all other work was conducted drawing upon our resources.

EXPOSURE TO OUTSIDE COMMENTS

In order to obtain the user reaction, the PP was discussed with knowledgeable people that included library users, information specialists, management people, sister establishments, and computer experts. Later, it was also discussed in the Meeting of the Heads of Libraries and TICs of DRDO held in Delhi in February 79. Due weightage was given to their view points.

COLLABORATION WITH ARDE COMPUTER CENTRE

The PP was initiated only after making sure that the Honeywell computer facilities of the ARDE Computer Centre are available for the project. The objective of the PP was discussed with them and the areas of work coming under the design and that of computer work were demarcated. Initial punching of input data on cards and COBOL programming of the various outputs were done by the Computer Centre. Close liaison and healthy understanding between the designers and the computer experts prevailed throughout.

RESULTS AND DISCUSSIONS

RESULTS

COMPUTER GENERATED OUTPUTS

The PP has resulted in six specimen outputs, three for books and PSCs, and three for reports, as follows:-

(a) Main record of books arranged under UDC numbers (appendix A);

(b) Subject Key to Main record of books (Appendix B);

(c) Title listing of books under names of authors (Appendix C);

(d) Main record of reports arranged under COSATI subject categories (Appendix D);

(e) Cyclic index i.e. subject key to reports (Appendix E); and

(f) Index to corporate authors.

DISCUSSIONS

JUSTIFICATION FOR USING COMPUTER

Use of computer to information processing in libraries, particularly in the Indian context is looked upon either with awe or scepticism. Often the question is raised whether it is really necessary and if so whether it is economically justifiable. Our own experience and the results of the PP definitely show that we must go in for computer processing when the facility is available. Our books and periodical assets (at cost) alone exceed Rs.40 lakhs and the annual investment is about Rs. 45 lakhs. The use made of this asset is limited at present. Computer processing definitely enhances the chances of putting these resources into greater use. There is no doubt about its economic justification when it is extended to cover the entire resources of the DRDO.

ADVANTAGES

There is no substitute for a reading list readily made available to a research worker at his table or the gains obtained by exposing him to the total resources of the system in a given field. Only computer can help us in achieving this objective on a large scale.

The various outputs obtained in the PP clearly show the additional approaches that we can create to the information resources. These approaches, particularly that of cyclic index, are not practicable by manual process.

CHOICE OF DATA ELEMENTS AND FIELD ORGANIZATION

Selection of data elements and field organization has been made on the basis of current practices followed in similar established information services, our own requirements of giving all the essential data and the need for economy. One may question the soundness of excluding many of the data elements associated with documents. These deletions are justified on the ground that the final outputs are to service the current, active and essential information rather than act as tools of physical bibliography.

The initial choice of Limited Field design had given rise to rigidity. In order to overcome this difficulty, the input field design is now changed to Variable Field by introducing tags for each field.

CHOICE OF INDEX LANGUAGES

Index languages used have given the satisfactory results from both subject display and retrieval angle. One could always differ from the choice of index languages selected i.e. UDC for books and COSATI categories and Cyclic index for reports. These differences of opinions are the results of genuine convictions and the library science literature is full of such discussions. There is no other alternative for UDC unless we are prepared to completely change the present method of indexing books not only in IAT but in almost all the libraries of DRDO. Even then, there is no other system available at present which is perfect and meets all the requirements.

The Cyclic index provides a unique subject approach to reports. It is simple to operate, precise and specific in approach and requires least effort on the part of indexer and the user. Its disadvantages can be overcome by building suitable sub-systems. Though there will be loss of information in retrieval by Cyclic index, even then, the success rate is between 50 to 60% which is higher than the recall achieved by using other index languages.

PROGRAMMING

The COBOL programming has given satisfactory outputs; but still there is scope for improving the format of the outputs to make them more elegant and achieve better impact on the user. The Honeywell 420 computer has certain limitations on storage and manipulation of large amount of data, particularly the exacting work of punching thousands of cards. These could be overcome when we have access to the new computer expected to be installed soon at ARDE.

CONCLUSION

The PP has proved the capability of the design to cover the entire resources of DRDO and thereby the feasibility of establishing a National Defence Science Document Handling System. The PP has also indicated the areas in which further work is needed and they are in the fields of standardization of document description, finding solutions to some of the indexing problems and refinement of format of various outputs.

Since the completion of the PP, the System has been established covering the resources of the R&D establishments located in Poona, and is working well. Efforts are continuing to extend the coverage to other sister establishments. Further work is in progress to switch over from the batch processing to that of an on-line inter-active system.

ACKNOWLEDGEMENT

This study and the system establishment would not have materialised but for the active interest and guidance of late Air Cmde S.K.Nair, AVSM, former Dean of IAT. Thanks are due to Sri N.S. Venkatesan, the Director of ARDE, Pune and in particular to Sri K.N. Nagarajan, Sri R.K. Pandit of ARDE Computer Centre for providing computer facilities and suitable programs. Thanks are also due to Cmde S.S. Venkateswaran, IN, Dean of IAT for his encouragement and permission to publish this account.

Appendix A

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           INFORMATION RESOURCES:(BOOKS)FOR R&D ESTS IN PUNE 1980
                          CLASSIFICATION WISE REPORT
843    678.01                   POLYMER TESTING
        SCHMITZ (JV) AND BROWN (WE)
        TESTING OF POLYMERS, VOL.3.
        NEW YORK           WILEY INTERSCI.       1960 379
        PAR
844    678.02                     POLYMERS, MANUFACTURING PROCESSES
        TUNG (LH) ED.
        FRACTIONATION OF SYNTHETIC POLYMERS.
        NEW YORK          MARCEL DEKKER       1977  P.748
        PER
845    678.026                     POLYMER COMPOSITES
        RANNEY (MW)
        REINFORCED PLASTICS AND ELASTOMERS: RECENT DEVELOPMENTS.
        NEW JERSEY       NOYES DATA                  1977 P.314
        PER
846     RICHARDSON (MOW)
        POLYMER ENGINEERING COMPOSITES.
        LONDON           APPLIED SCIENCE             1977 P.568
        PER
847    678.026:624              PLASTICS REINFORCED:STRUCTURES
        HOLLAWAY (L)
        GLASS REINFORCED PLASTICS IN CONSTRUCTION-ENGINEERING ASPECTS
        GLASSGOW       /SURREY UNIV.               1978 P.228
        PIA
848    678.046:678.026          PLASTICS,FILLERS AND REINFORCEMENTS
        KATZ (HS) AND MILEWSKI (JV)  ED.
        HANDBOOK OF FILLERS AND REINFORCEMENTS FOR PLASTICS.
        NEW YORK         VAN NOSTRAND REIN           1978 P.652
        PER
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849 678.074 ELASTOMERS
FERRY (JD)
VISCOELASTIC PROPERTIES OF POLYMERS.
NEW YORK WILEY 1978 671
PIA

850 678.4:027 RUBBERS, MOULDING
WHEELANS (MA)
INJECTION MOULDING OF RUBBER.
LONDON BUTTERWORTHS 1974 P.241
PIA

851 678.632 EPOXY RESINS
POTTER (WG)
USES OF EPOXY RESINS.
LONDON NEWNES-BUTTERWORT 1975 P.281
PIA

852 678.743 POLYMER PVC
S.B.P. BOARD OF CONSULTANTS AND ENGINEERS
PVC COMPOUNDING AND PROCESSING.
DELHI SMALL BUSINESS PUBLICATI P.212
PER

Appendix B

INFORMATION RESOURCES:(BOOK) FOR R&D ESTS IN PUNE R&D ESTS 1980
KEY TO SUBJECT INDEX

PHYSICAL CHEMISTRY:POLYMER	678:541.1
PHYSICAL CHEMISTRY	541.1
PHYSICAL METALLOGRAPHY:METALLOGRAPHY	669.017:620.18
PHYSICAL METALLURGY:ELECTRON	669.017:539.124
PHYSICAL METALLURGY	669.017
PHYSICS	53
PHYSICS AND CHEMISTRY HANDBOOK	53+54(02)
PHYSICS,APPLIED	53*62
PHYSICS,PRACTICALS	53.087
PISTOLS AND REVOLVERS	623.443
PISTON ENGINES,SMALL	621.432-181.4
PLANETS AND SATELLITES,ORBITAL MOTION	521.5-.6
PLANT, PROCESSES COST ESTIMATION	66.03.003
PLASTIC FINISHING:METALLIZATION	621.793:678.029
PLASTICITY:MATERIALS	62.002.3(047.1):539.214
PLASTICS	678
PLASTICS REINFORCED:STRUCTURES	678.026:624
PLASTICS,FILLERS AND REINFORCEMENTS	678.046:678.026
POLYMER:PHYSICAL CHEMISTRY	678:541.1
POLYMER ANALYSIS	678*543(084.4)
POLYMER COMPOSITES	678.026
POLYMER PVC	678.743
POLYMER SYMPOSIUM:POLYMERIZATION	678(082.2):66.095.2
POLYMER SYMPOSIUM:SCATTERING LIGHT	678(082.2):535.43
POLYMER SYMPOSIUM	678(082.2)
POLYMER TESTING	678.01
POLYMERIZATION:POLYMER SYMPOSIUM	678(082.2):66.095.2
POLYMERS:INORGANIC CHEMISTRY	546:678
POLYMERS	678
POLYMERS,INORGANIC	678.86
POLYMERS,MANUFACTURING PROCESSES	678.02
POLYMERS,PROPERTIES	678.01
POWER CONTROLS:THYRISTORS	621.316.72:621.382.333
POWER DISTRIBUTION,SWITCHGEAR	621.316
POWER GENERATION	621.311
POWER REGULATION:MICROPROCESSORS	681.31-181.4:621:316.7

POWER SEMICONDUCTORS	621 382.333:621.314.632
POWER TRANSMISSION,MECHANICAL	621=231
PRESSURE EFFECTS:MECHANICAL PROPERTIES	539.3:539.89
PRESSURE VESSELS:STRUCTURAL DESIGN	621-46:624.04
PRINTED CIRCUITS	621.38.049
PROBABILITY:MEASURE THEORY	519.2:519.53
PROBABILITY:STATISTICAL MECHANICS	519:21:531.19
PROBABILITY:SYSTEM ENGINEERING	621-5:519.2
PRODUCTION MANAGEMENT	658.5
PRODUCTION TECHNOLOGY	621.7-.9
PROGRAMMING:ANALOGUE COMPUTERS	681.3.06:681.33
PROGRAMMING:BUSINESS	681.3.06:65
PROGRAMMING:COMBINATORICS	65.012.1:519.1
PROGRAMMING:MICROPROCESSOR	681.31-181.4:681.3.06
PROGRAMMING	681.3.06
PROGRAMMING COBOL	681.3.06C
PROGRAMMING, BASIC	681.3.06B
PROGRAMMING, COMPUTER	681.3.06

Appendix C

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          INFORMATION RESOURCES(BOOKS) FOR R&D ESTS IN PUNE 1980
                               AUTHOR-CATALOUGE
SANDER  (KF) AND REED (GAL)
     TRANSMISSION AND PROPAGATION OF ELECTROMAGNETIC WAVES
     PIA 621.37
SANDERS (DH)
     COMPUTERS IN BUSINESS:AN INTRODUCTION:
     PAR 681.31:658
SANDIGE (RS)
     DIGITAL CONCEPTS USING STANDARD INTEGRATED CIRCUITS
     PER 681.38.049*681.32
SARAF (B) ET AL.
     PHYSICS THROUGH EXPERIMENT.VOL 1:EMF CONSTANT AND VARYING.
     PIA 537.3
SARDA (NL)
     COBOL PROGRAMMING WITH BUSINESS APPLICATIONS.
     PAR   681.3.06C
SASTRY (HSN)
     EFFECT OF VIBRATIONS ON CONVECTION HEAT TRANSFER IN DOUBLE PIPE HEAT EXCHA
     NGERS.
     PIA 536.24:621-71
SAWIN (DH)
     MICROPROCESSORS AND MICROCOMPUTER SYSTEMS.
     PIA 681.31-181.4
SAXENA (VP) ET AL.
     ARUN'S GUIDE-NATIONAL DEFENCE ACADEMY EXAMINATION CONTAINING OBJECTIVE TYP
     E QUESTIONS
     PIA 371.27(026)
SCHARDIN (H) AND HELWICH (O)
     KURZZEITPHOTOGRAPHIE:FOURTH INTERNATIONALE KONGRESS,KOLN,1958.
         778.37
SCHECHTER (M)
     MODERN METHODS IN PARTIAL DIFFERENTIAL EQUATIONS-AN INTRODUCTION.
     PIA 517.944
SCHEIL (FR) AND MATLOCK (B)
     INDUSTRIAL WELDING PROCEDURES
     PAR 621.791
SCHMITZ (JV) AND BROWN (WE)
     TESTING OF POLYMERS.VOL.3.
     PAR 678.01
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Appendix D

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        INFORMATION RESOURCES: (REPORTS) FOR R&D ESTS IN PUNE 1979-80
                          CLASSIFICATION,WISE REPORT
ARMY CONCEPTS ANALYSIS AGENCY  MARYLAND
   NONNUCLEAR AMMUNITION COMBAT RATES PROGRAMMING FY75-79, VOL  4, PART 1,
   ANNEX. C: METHODOLOGY.
   FINAL REP AMMO 75-79       1977          PAR,9066                   00221
ARMY MATHEMATICS STEERING COMMITTES  U.S.A.
   PROCEEDINGS OF THE 1977 ARMY NUMERICAL ANALYSIS AND COMPUTERS CONFERENCE
                              1977          PAR 9081                   00222
INDIAN INSTITUTE OF TECHNOLOGY,BOMBAY
   SHORT TERM COURSE ON MICROPROCESSORS AND APPLICATIONS, JUNE 5-JUNE 22,
1978: LECTURE NOTES
                              1978          PIA A-13742                00223
   SHORT TERM COURSE ON MICROPROGRAMMING AND APPLICATIONS,
   MAY 4-MAY 17, 1977
                              1977          PIA A-13658                00224
INSTITUTE OF MATHEMATICAL SCIENCES, MADRAS
   PROCEEDINGS OF ONE-DAY SYMPOSIUM ON COMPUTERS IN SCIENCE AND INDUSTRY.
   SRINIVASA RAO (K) ED.
   MATSC. 67                                PIA 24707                  00225
JOHNS HOPKINS UNIVERSITY, MARYLAND APPLIED PHYSICS LABORATORY
   DOD WEAPON SYSTEM SOFTWARE MANAGEMENT STUDY APPENDIX A: FINDINGS AND
   RECOMMENDATIONS OF PREVIOUS STUDIES
   PARK,JM.
                              1975          PAR 9075                   00226
   DOD WEAPON SYSTEM SOFTWARE MANAGEMENT STUDY  APPENDIX B:
   SHIPBORNE SYSTEMS
   DAVIS (JF) AND BRADSHAW (AF)
                              1977          PAR 9072                   00227
   DOD WEAPON SYSTEM SOFTWARE MANAGEMENT STUDY, APPENDIX D: UNDERSEA AND
   L+ DBA2+D SYSTEMS.         1977          PAR 9074                   00228
   DOD WEAPON SYSTEM SOFTWARE MANAGEMENT STUDY. APPENDIX D: UNDERSEA AND
   LANDBASED SYSTEMS.
                              1977          PAR 9074                   00229
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
    DYNAMIC FILE ALLOCATION IN A COMPUTER NETWORK
    FRANCISCO DE ASIS ROS PERAN
                              1976          PAR 9082                   00230
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D.C.
    MATHEMATICAL COMPUTER PROGRAMS
    NASA SP-5069              1966          PRD 7556                   00231
NATIONAL TECHNICAL INFORMATION SERVICE. VIRGINIA
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Annals of Library Science and Documentation
1981, 28(1-4), 32-38.

MÖSSBAUER EFFECT STUDIES—SOME DEDUCTIONS FROM A BIBLIOMETRIC ANALYSIS

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Bibliometric analysis of papers in 'Mössbauer Effect' as covered in the Physics Abstracts has been carried out over a period of more than two decades since its discovery. The analysis leads to the following significant deductions:- (i) The growth curve of applications in this field tends towards a saturation as the Silver Jubilee of the 'Mossbauer Effect' approaches. (ii) The growth curves papers published in the branches of physics, chemistry, metallurgy and instrumentation tend to saturation level. But activity in the new branches of biology and archeology is expected to pick up. (iii) USA followed by USSR tops the countries publishing in this field; India occupies the 7th rank. (iv) Major portions of the contributions from India is from the universities and the academic institutions. Research in this field was not initiated for nearly a decade after its discovery in the national laboratories of India and the contributions from the defence research establishments is almost nil. (v) English language is found to be the best lingua franca for quick and wide dissemination of scientific information.

INTRODUCTION

Active research workers spend considerable amount of their time in survey of literature in those branches of science of their interest. For efficient programming of any research project, continuous collection of new information and proper evaluation of such information are musts. Considerable saving of time and labour in such activities has not accrued to research workers because of new innovations and techniques developed by the 'information science'. Selective dissemination indexes (SDI) from computer stored information is a typical example of such services.

Information science has found applications in such fields as science policy planning, evaluation of scientific projects, survey and forecasting of growth of different branches of science, etc. Viewed from the angle of this new branch of science, any research activity can be defined as a search for new information in the light of available information.

Information science has a good impact on the modern industrial world because of its indispensibility in the development of new technologies, updating of existing technologies or evolving appropriate technologies. It is said that the wide gap in the living standards of people in the developed and developing countries can be reduced considerably by the use of techniques of information science in the developing countries, since one of the bottle necks in the progress of the developing countries is lack of information about appropriate technologies.

Bibliometric analysis is one of the techniques followed in the information science to evaluate the growth of research in any field. Periodical assessment of growth rates in different fields of research will have value to research workers because they will indicate which branches of science are indicating tendencies of rapid growth in future. Just as the correct choice of a profession by a youngman early in his career decides to a large extent his final material success in life, the correct choice of the field of research activity by a scientific team also is largely responsible for the prestige of the team in the scientific work. "The early bird catches the worm" is true in the scientific activity as in any other activity.

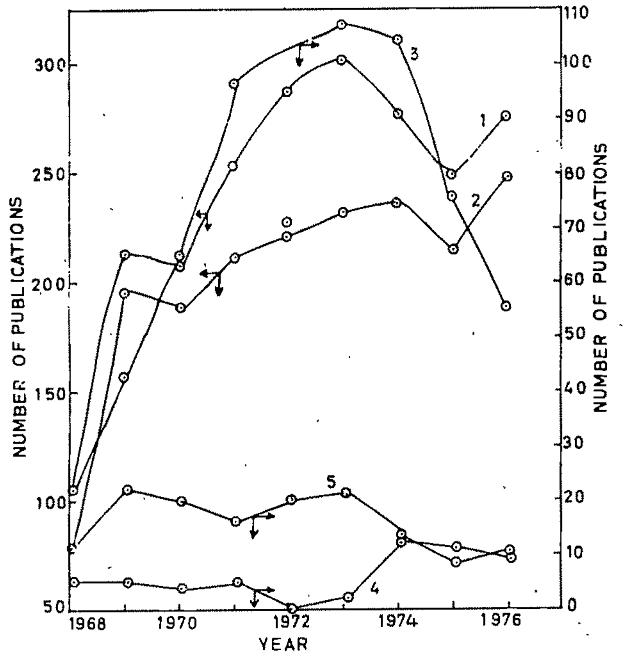

Fig. 2 Graphical Representation of Yearly Distribution of Papers in different Branches of Mossbauer Effect - 1. Physics, 2. Chemistry, 3. Metallurgy, 4. Biology and 5. Apparatus.

Table: 2. Share of Different Countries to the Contribution to Mossbauer Spectroscopy

Years	Countries													
	USA	USSR	Germany	UK	Japan	France	India	Israel	Netherlands	Canada	Poland	Australia	Italy	Hungary
1968	49	8	9	11	4	1	14	4	2	-	3	1	4	2
1969	120	10	25	40	14	4	33	17	8	8	-	2	4	2
1970	117	31	31	40	17	10	13	14	3	9	7	2	8	4
1971	139	81	36	27	21	26	18	21	9	13	16	6	5	11
1972	133	91	40	27	26	21	42	15	6	14	8	3	6	8
1973	119	110	42	22	36	33	28	15	7	14	8	12	7	9
1974	108	68	60	25	33	32	12	21	14	9	10	13	6	6
1975	67	102	53	29	27	30	21	14	16	12	15	5	2	6
1976	117	72	49	33	23	43	19	18	21	14	10	5	7	3
1977	74	66	61	26	36	25	16	17	27	17	13	7	7	2
TOTAL	1043	639	406	280	237	225	216	156	113	110	90	56	56	53

Yearwise contribution of only the first 14 countries arranged according to the number of publications contributed are reported in the above Table. The total contributions from the other countries, who have contributed at least a total of ten papers in 1968-1977 are as follows:-

Rumania 50; Belgium 46; Denmark 42; Brazil 32; Sweden 29; Switzerland 29; Czechoslovakia 20; Greece 18; Finland 17; Yugoslavia 16; Bulgaria 15; Korea 13; Austria 12; Newzealand 10.

in this branch will continue to be steady. The curve corresponding to biology branch shows that the activity is nearly steady even though the number of papers published during the whole period of analysis (1968-76) is small. The yearly analysis of data regarding papers originating from different countries in the different branches reveal that studies in this branch have been initiated only recently in USA and USSR, the two countries leading in scientific research. Hence it is justified in predicting that there will be good activity in this branch in the near future. Mossbauer Effect has recently found application in archeology and it can be surmised that more papers may be published in this new branch.

4. COUNTRIES CONTRIBUTING TO MÖSSBAUER EFFECT STUDIES

The share of different countries on the total number of papers in different years is shown in Table 2. It is seen that USA followed by USSR not only occupy the top positions, the total contributions from the two countries account for 40% of the total. Not only Germany (FDR and GDR combined) has the third rank in the number of papers published, the output from Germany is double that from UK which occupies the next rank. Number of countries around Germany have contributed more papers in this field than in other fields of physics. This observation clearly reveals that the 'effect of proximity' does play a considerable role in inducing people to take interest in developments in their neighbourhood even in scientific research. Brazil and Korea have contributed 32 and 13 papers, numbers considerably more than the number of contributions to other fields of physics from these countries. The obvious reason is that schools of research might have been set up by some visiting scientists from a developed country. It is no surprise that contributions from a large number of developing countries and countries from the oil/rich Middle East are insignificant and that developed countries of the West account for major portion of the output, since such is the trend observed in all other scientific and technical fields. Hence it is clear that schools of studies in Mossbauer Effect are confined to a few developed countries. India is a unique example, though a developing country, yet having active schools of research in this field.

5. ANALYSIS OF CONTRIBUTIONS FROM INDIA

It is gratifying to note that despite the low per capita income and difficulties in getting facilities in research and limited job opportunities, Indian scientists could keep up their tempo of research even in a recent field as 'Mossbauer Effect'. While answering why India has taken efforts to launch an artificial satellite despite conditions of poverty in the country, our Prime Minister, Smt. Indira Gandhi, pointed out that this would show the world that India, even though may be poor in material wealth, is rich enough in intellectual calibre, inventive genius and ability to chalk out and work gigantic plans. The fact that India ranks seventh in the order of nations contributing to the 'Mossbauer-Effect' studies justifies the faith our Prime Minister has in Indian scientists

With a view to knowing the locations of the research schools, the institutionwise break up of published papers is shown in Table 3. Of the 216 papers, published in the decade, 93 are from universities. If the contributions from the IITs, BARC and TIFR are added to this, it is evident that 85% of the total contributions are from this group. Analysis made by Miss Poonam Bhatnagar (3) has shown that research activity is confined to a few centres. The analysis of Rangarajan et al (1) has also revealed that active research in physics is confined to a few centres. The yearwise analysis of outputs has indicated (3) that while there is a regular flow of papers from the BARC, TIFR and IIT Kanpur, the output from the universities is erratic. Output of papers from the National Laboratories have started only after 1968, indicating research in this field at these laboratories was not initiated for nearly a decade after the discovery. Even though Mossbauer Effect studies have great relevance to material science, it is surprising that no research paper from the Defence Research Establishments has been included in the Physics Abstracts.

6. ENGLISH LANGUAGE - THE EFFECTIVE VEHICLE FOR SCIENCE COMMUNICATION

The discovery of Mossbauer Effect was first reported in a German journal in 1958. World wide interest in this study was initiated only after 1960 following the publication confirming the results in US Journal. A comparison of the rates of growth of papers in the two fields of research where considerable activity is observed over several years, viz. the 'Raman Effect' and the 'Mossbauer Effect' is made in Table 4.

It is seen that active research work has been taken up at several centres within a short period after the discovery of Raman Effect, as is evident from the fact that the number of papers published in the first years are 58, 233, 416, 603 and 778. In case ofMossbauer Effect the corresponding numbers are a few, 38, 74, 141 and 204. However, after the 12th year, the cumulative number of papers published

Table: 3. Institutional Distribution of Papers from India

Institutions	Years										To-tal
	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	
Universities	6	13	5	12	20	10	4	9	7	7	93
IITs	1	1	3	1	7	3	5	6	5	5	37
TIFR	4	7	1	2	6	5	-	2	1	1	32
BARC	2	4	1	2	4	6	1	1	1	1	23
FCI	-	-	1	-	-	-	-	-	-	-	1
IAC Sci.	-	-	-	-	1	1	1	1	-	-	4
II Sci.	-	-	-	-	-	1	-	1	-	-	2
Inst. Sci.	-	-	-	-	-	1	-	-	-	-	1
AIIMS	-	-	-	-	-	-	1	-	1	-	2
Saha Instt. of Nuclear Physics	-	-	-	-	-	-	-	-	1	-	1
NCL	1	5	1	-	-	-	-	1	-	-	8
NPL	-	3	1	1	4	1	-	-	-	1	11
Reactor Res. Centre	-	-	-	-	-	-	-	-	-	1	1
Ttotal	14	33	13	18	42	28	12	21	19	16	216

Table: 4. Comparison of Growth of Raman Spectroscopy and Mossbauer Spectroscopy during First Two Decades

Years after their discovery	Total No.of papers published	
	Raman spectroscopy	Mossbauer Spectroscopy
1	58	-
2	233	38
3	416	74
4	603	141
5	778	204
6	907	261
7	1084	421
8	1323	645
9	1568	912
10	1785	1200
11	1992	1603
12	2151	2035
13	2301	2545
14	2451	3051
15	2580	3630
16	2666	4180
17	2756	4714
18	2833	5212
19	2941	5638
20	3071	-
21	3252	-
22	3407	-
23	3644	-
24	3790	-
25	3948	-

in Mossbauer Effect exceeds that for Raman Effect. The initial lag in the follow-up studies is obviously due to the lack of wide and quick dissemination of information about this discovery in the Scientific Community. This ovbiously is due to the discovery being reported in a journal not published in English. This significance to developing countries, viz. that English language is the best vehicle for quick and wide dissemination of scientific information.

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SELF CITATIONS BY INDIAN LIBRARY SCIENTISTS

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The study is based on the citations appearing in the Annals of Library Science (afterwards Annals of Library Science and Documentation) during 1954-1975 (Vols. 1-22). Of the 1545 citations appeared in the journal, 231 were self citations (books-121, periodical articles-100, conference proceedings-8, and theses-2), accounting for 14.9% of the total citations. Of the self-citing authors, S.R. Ranganathan tops the list with 174 self citations.

0. INTRODUCTION

Citation analysis is said to be an effective tool to decide the use of literature in a specific field. No document can be adjudged fully valid and authentic if it is not supported by citations. It has been studied and found that the number of most cited titles is very small in the "Annals of Library Science and Documentation."

The analysis has been made about the recall and self citations, which means how many self citations have been really used to support the context. Fussler's (1) study, for example, showed that in Chemistry and Physics, a single important journal in each field contained 25% of self cited references of useful literature.

Similar studies had also been made by Brown (2) and Morgan (3) where they had shown, that in the field of Physiology there was a marked tendency to cite earlier works by most authors and hence, 30-35% self citations become essential in the field.

It had been noted earlier in 1937, that Dalziel (4) did not include the self citations in his study, arguing that their inclusion would distort the final results by not showing the relative usefulness of different journals. Most researchers, however, believed that this type of citation should be included in the final tabulation, since, it too represents actual library or literature use. In agreement with this argument self citations have been included and is treated as attested true copies of the past work in support of the present.

It had been said that any new information must be properly fixed in the fabric of woven knowledge by adequately citing the previous works. New achievements are daily made in the ever growing universe of knowledge and if they are not recorded they will be lost. Unless we relate the new to the old, no one is going to accept the newness of the work. That is why theses or statements without citations have to face severe criticisms. If the relationship is not established with the past, there may be good reason to doubt the alleged newness of present works.

Citation index is one of the latest and effective tools based on the inter relationship of papers through their citations. It appears, there are many library science papers without reference to the available literature. Feinchel (5) studied the citation pattern in information science and found a tendency for like documents to cite each other.

Taylor (6) believes that the citation pattern in the area of library science is much less clear and definite than that of many scientific disciplines. Gilchrist (7) studied the field of documentation by measuring the coverage of primary journals by secondary journals. He was able to identify the 'key' journals in the field documentation by this method.

One important aspect of a citation is its relevance or appropriateness in the specific context. This study has revealed that in a number of cases the whole book has been cited when only a chapter of the book is really relevant in the context. At times, even apparently irrelevant materials have also been cited which are likely to lead to false retrieval so far as the readers are concerned. At times, about 30% of citations were of such non-relevant nature which gave negative results For example, while discussing 'obsolescence' some authors had cited articles where only the word 'obsolescence' was present which increased the number of citations but did little to support the text.

1. METHODOLOGY

For the present study the "Annals of Library Science and Documentation" had been taken as the sample. Vols. 1-22 from 1955-1975 were taken into consideration. A total of 302 articles were scanned and the citations given at the end of articles were noted down on slips in the same form as given by the author. For each citation one slip was prepared. A total of 1545 slips were prepared and they were arranged in different sequences for different studies.

Out of these slips the self-cited citations were taken out and analysed.

2. OBSERVATIONS

When the total sample was analysed, out of 587 books cited only 121 were self-cited that came to about 20.9% of the books cited and 7.8% of overall citations. Similarly in the case of periodical literature it was observed that 100 out of 567 items were self-cited i.e. 17.6% of the total periodical citations and 6.5% of overall citations. For other types of documents 8 out of 125 conference proceedings and 2 out of 8 theses and unpublished documents were self-cited. Thus, out of 1545 citations only 231 were self citations which was calculated as 14.95%. In comparison to the findings of Fussler, Brown and Morgan where the highest percentage was 30, the present percentage of self-citation is quite low. Table 1 gives the details.

Table: 1. Self Citation by Authors, their Percentage, Overall Percentage

S.No,	Types of documents	No.of self citations	% of self citations	Overall self citations % out of 1545
1.	Books	121	20.9	7.8
2.	Periodical Articles	100	17.6	6.5
3.	Conference Proceedings	8	6.4	0.5
4.	Theses/Unpublished documents	2	25.0	0.1
	TOTAL	231	--	14.9

Table: 2. Self Citations Made by Authors

S.No.	Authors	Periodicals	Books	Conf. Proc.	Unpub. Doc. Thesis	Total	% Out of 231	Overall % (1545)
1.	**Ranganathan(SR)**	64	108	2	x	174	75.3	11.2
2.	**Others**	36	13	6	2	57	24.7	3.7
	TOTAL	100	121	8	2	231	100	14.9

Out of 217 citations of articles in Indian periodicals, 110 articles were from the same periodical, i.e. the Annals of Library Science and Documentation, which had the largest number of citations. This indicates that the self-cited periodical articles were largely confined to a single periodical. The tally was about 50%. The reason might be that as a journal is said to be specialised in a particular field so an author also is specialised in a particular field.

21. Self Citation by a Particular Author

Out of 231 self citations of books, periodicals, conference proceedings, thesis and unpublished documents it was quite surprising to note that S R Ranganathan alone was responsible for 174 citations. Other authors together self-cited 57 items in all. These 57 self citations included Indian as well as foreign contributions. The details are given in Table 2.

From the above Table, it is clear that S R Ranganathan alone cited 75.3% of the total self citations to Indian periodicals or 11.2% of the total self citations. Rest of the authors cited 24.7% of the self citations i.e. 3.7% of the total self citations.

3. CONCLUSION

i) Authors have to cite their own works as evidence, or in support.

ii) Authors have to use self citations to interlink the development of thoughts or ideas of past, present and future to avoid criticisms on validity.

iii) Non-relevant items should not be cited to make the citation list long. Let the citation list be uptodate and contain only relevant reference to avoid noise and false retrieval.

iv) Self citation in the same journal is often high. This reveals a publishing preference by most authors. Usually, a scientist prefers his papers to be published in the same journal which he reads.

v) A journal may be particularly renowned for publishing papers in a speciality. So an author will continuously send his articles to the same journal if he is working in this speciality.

vi) Self citations are more, because the scientists generally tend to carry on research within one basic field. One may pursue the study of a specific avenue of research within the main body since some of his work may be based on earlier observations.

vii) Ranganathan made the maximum number of self citations and thus his method of writing and citing was more scientific and authentic. He linked the arguments with past and present works, to make his contributions authentic.

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Annals of Library Science and Documentation
1981, 28(1-4), 42-53

INFORMATION RESOURCES, SERVICES AND INFORMATION NEEDS IN CHEMISTRY AND CHEMICAL TECHNOLOGY IN INDIA: A SURVEY

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It has been proposed to develop the National Chemical Laboratory library into a National Information Centre for Chemistry and Chemical Technology (NICHEM) under NISSAT. Establishment of such a major facility requires some knowledge of the available resources and the needs of potential users of information in the field. For this, a survey has been carried out to ascertain the above by sending a set of questionnaires to an adequate population of potential users in the field. Returns have been analysed and the results are presented in this paper. The survey clearly indicates the need for establishing NICHEM at NCL.

0. INTRODUCTION

The Science and Technology Plan for 1974-79 prepared by the National Committee on Science and Technology (NCST) provides ample evidence of Government's commitment for the development of science and technology in India. NCST formulated these plan proposals with the assistance of 27 Panels consisting of 233 Planning Groups. The totality of nation's scientific and technological needs were divided into 27 sectors and were named as Panels. One of the important Panels was on Information [1]. This panel reviewed various aspects of information and envisaged the establishment of a National Information System for Science and Technology (NISSAT). The objectives of this system were to augment the information facilities in the country to meet the needs of scientists, technologists, management personnel and technicians, working in R & D organisations, government departments and private and public sector undertakings. The NISSAT network would be built up on the existing infrastructure by integrating and coordinating the available services and activities and by seeking co-operation of individual information centres. Weak links and gaps would be identified for strengthening them or for establishing new services. The main components of NISSAT are:

(1) The NISSAT National Focal Point in the Department of Science and Technology (DST), and

(2) The NISSAT Network of services : This will consist of (a) the sectoral information centres on different sectors based on disciplines, products, missions etc. and their local information units (LIUs); (b) the Regional System comprising of Regional Centres (RC); and (c) other specialised supporting services like computerised based SDI services, on-line access to data bases and document supply facilities etc. (8).

01. National Information Centre for Chemistry and Chemical Technology (NICHEM) :

Information Centre for Chemistry and Chemical Technology proposed to be established at NCL will be one of the Sectoral Information Centres (SICs) to cater to the information needs of one of the largest sector in science and technology.

02. Survey of the Information Resources and Needs.

To initiate the establishment of such a major facility at the national level, some knowledge of the resources in the field as well as the potential users in the country is required. One of the important methods to acquire such knowledge is to conduct surveys. Several such surveys have been conducted in different fields of science and technology (2,5,6,7). It was decided to conduct a survey to assess the needs for information facilities by research institutions and industrial organisations in chemistry and allied fields. The results of this survey are presented in this report.

INFORMATION RESOURCES, SERVICES IN CHEMISTRY IN INDIA

1. THE SURVEY

1.1 Objectives

The main objectives of this survey are :

(1) To obtain the overall perspectives of R & D establishments, industrial organisations and research and trade associations who are the potential users of the proposed services.

(2) To ascertain the sources of information available with them.

(3) To identify the needs of information and documentation services by the potential users.

(4) To identify translation facilities available with them and their needs for the same.

(5) To ascertain the existing reprographic facilities and the needs thereof.

1.2 Methodology

A questionnaire was suitably designed keeping in view the objectives enumerated above. This is reproduced in Appendix I. This questionnaire was mailed to a select population of potential users. Some of the bigger industrial centres like Bombay, Delhi, Calcutta, Madras, Hyderabad, Bangalore, Ahmedabad, Baroda and Surat were surveyed through personal visits also.

1.3 Scope

The parties questioned under the survey were educational and training institutes, R & D organisations, research and trade associations and they were selected from the following sources.

1. The Directory of Scientific Research Institutions in India - Indian National Scientific Documentation Centre, New Delhi. - 1969.
2. CPMA Directory - Chemical Plant and Machinery Association of India, Bombay. - 1973.
3. Indian Chemical Directory, 11th ed. - Technical Press Publication, Bombay.
4. Indian Industries, 14th Ed. - Indian Industries Publications, Bombay. - 1977.
5. Industrial and Commercial Directory of Puna - 2nd Ed. Mahratta Chamber of Commerce and Industries, Pune. - 1978.
6. Times of India Directory and Year Book including Who's Who - Times of India Press, Bombay. - 1977.
7. Manufacturer's Directory, 9th Ed. - Indian Chemical Manufacturer's Association, Calcutta. - 1978.

1.4 Sample

A total of 1360 questionnaire blanks were mailed. About 93 organisations were not traceable and the questionnaires were returned undelivered. The other 1267 organisations could be contacted in the first mailing effort. About 40 new organisations were contacted while making personal visits in the major industrial centres like Bombay, Delhi, Calcutta, Madras, Hyderabad, Bangalore, Ahmedabad, Baroda and Surat. In this way the total number of organisations contacted rose to 1307. Out of these 216 parties responded to our questionnaire. Overall response thus worked out to be 16.53%.

1.5 Sample Distribution

Organisations responding to our questionnaire are divided into 6 major groups as given in the figure 1. The largest group of respondents is small scale sector followed by private sector and public sector. This trend points out that industrial units more eager in making use of information services. The other major groups of respondents who have shown interest are R & D organisations and academic institutions. This pattern of distribution resembles other surveys such as the Food Survey conducted by CFTRI /‾ 2 _/.

On analysing the replies to question 6 of the questionnaire, it is observed that many respondents have more than one subject of interest in their activity. These activities have been divided into 14 major subjects. These are given in figure 2. General chemistry, chemical technology, colour chemicals and organic chemistry are more favoured subject areas. Spectrum of subjects of interests of respondents embraces all aspects of chemistry and chemical technology. It is therefore necessary that the proposed centre (NICHEM) should try to meet the requirements of all categories. Its services should be oriented to meet the increased demand of industries which is likely to be the biggest group of potential users.

2. R & D : PROBLEMS AND FACILITIES

2.1 Technical Problems

Question 7, 8, 9 and 10 of the questionnaire were designed to ascertain the technical problems, R & D facilities and methods of solving the R & D problems of the organisations. Replies to question 10, illustrated in Table 1, indicate that many industries have more than one problems as ennumerated in the question. Testing of products is a major problem for a number of respondents. Problems relating to quality control and standardisation rank second and third respectively. Around 50 respondents have got various other problems such as procurement of raw materials and equipment, by-product utilization, cost reduction and development of new items etc. They had tried to solve these problems through a variety of sources such as their own R & D set-ups, consultants, national laboratories, collaborators etc. These are discussed in the following para. The proposed Information Centre will have to keep these problems in mind while initiating the information and documentation services in chemistry and chemical technology.

2.2 Method of solving problems.

Table 2 indicates that the majority of the organisations have got their own set-up to solve the R & D problems. Others solve their problems with the assistance of consultants (26.85%), national laboratories (22.22%) and foreign collaborators (13.43%).

2.3 R & D Facilities.

In the previous section, it is observed that nearly 81.48% organisations own their R & D set-up. Details of expenditure and staff deployment in these R & D setups are given in table 3a and 3b. A close look at the tables shows that the majority of them spent over Rs. one lakh annually on R&D units. There are about 98 units who employ below 20 persons, on the other hand there are 56 units who employ above 100 staff in their R & D establishments.

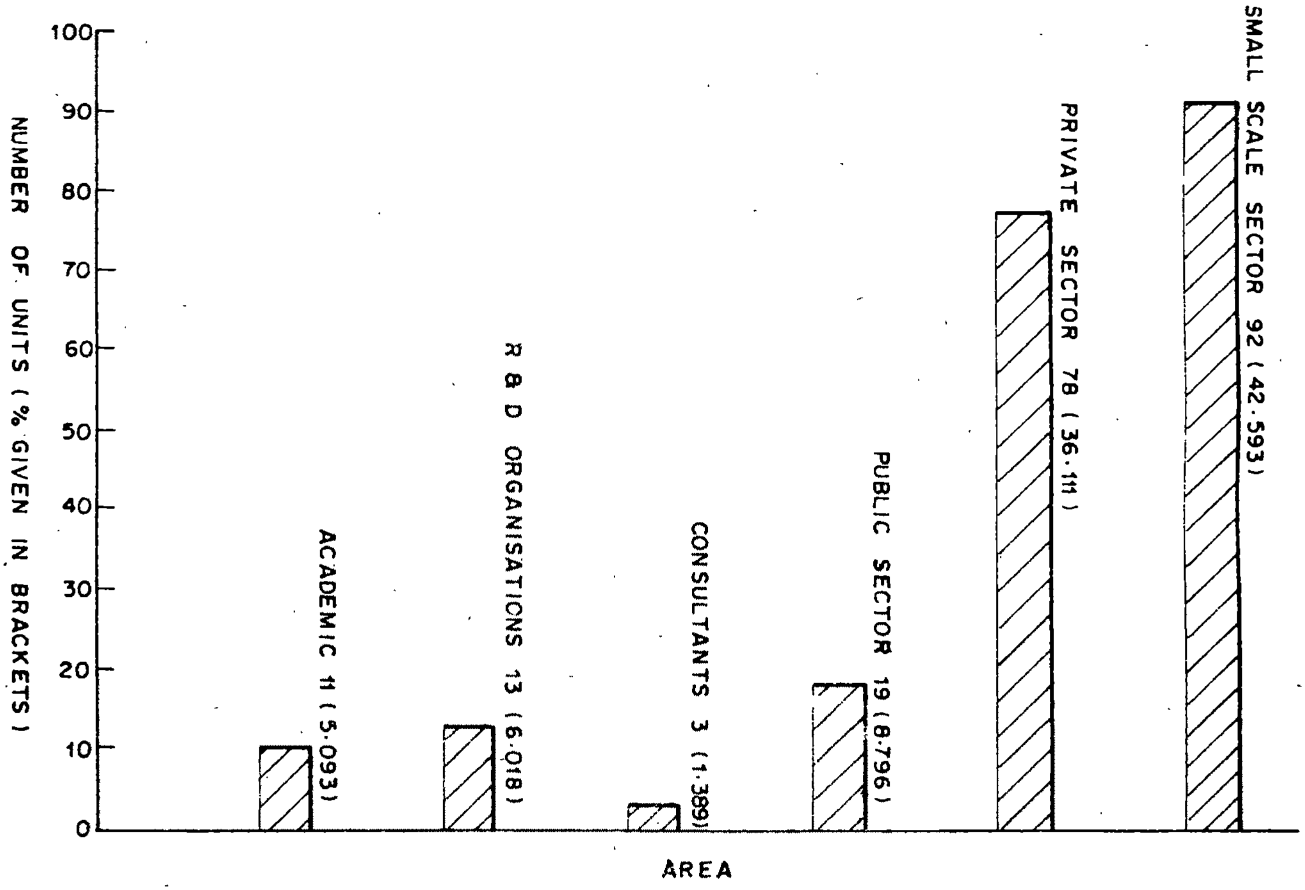

Figure 1. DISTRIBUTION OF RESPONDENTS BY AREA

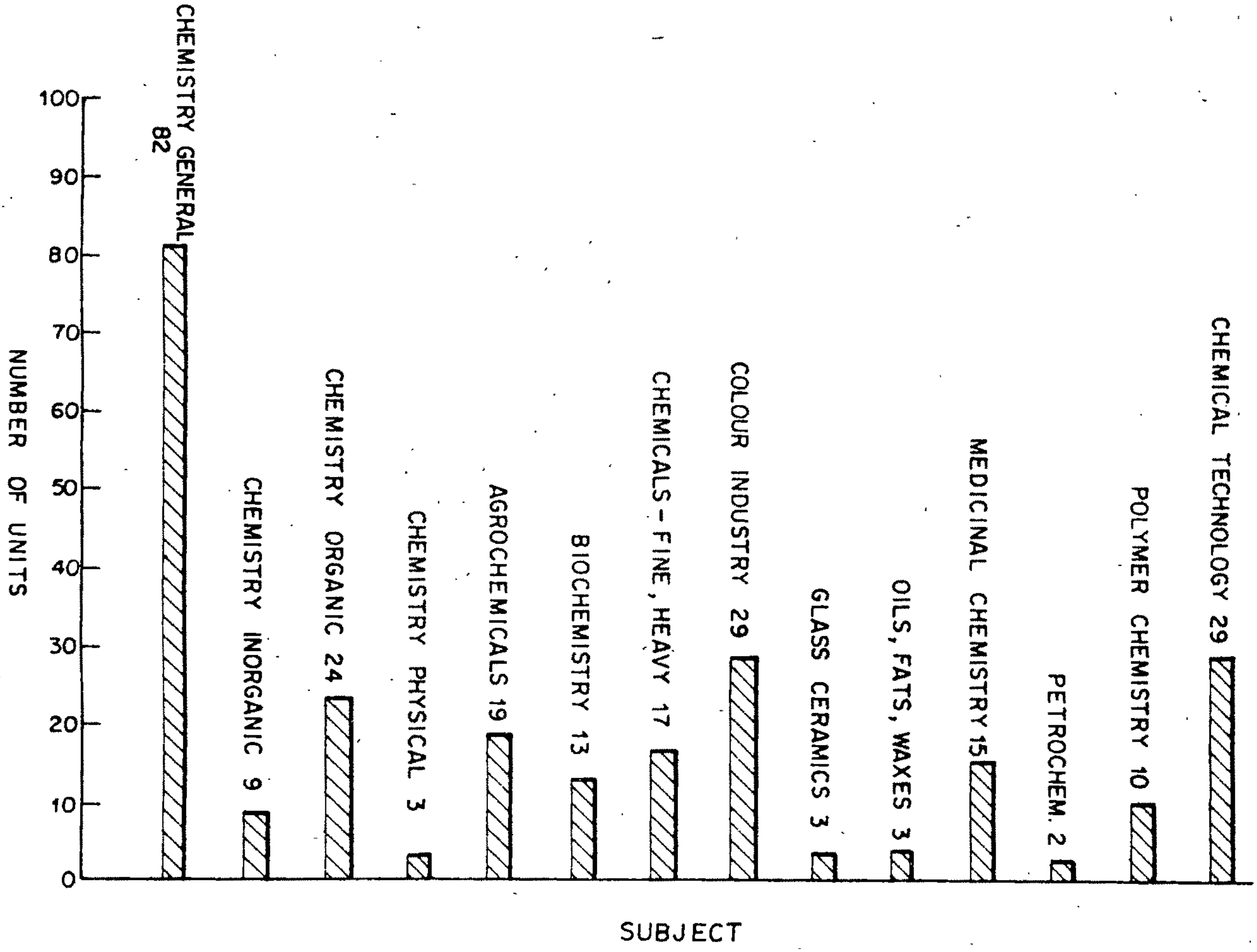

Figure 2. DISTRIBUTION OF RESPONDENTS BY SUBJECT

Note: The sum total of industries in the chart is more than the total number of respondents (216) because several industries cover more than one subject.

Table 1. Technical Problems.

S.No.	Type	No.	Percentage for 216 respondents.
1.	Testing	79	36.57%
2.	Quality Control	53	24.54%
3.	Standardization	49	22.69%
4.	Others	50	23.15%

Table 2. R & D Problems How they are solved.

S.No.	Source	No.	Percentage for 216 respondents.
1.	Own setup	176	81.48%
2.	Collaboration (foreign)	27	12.50%
3.	Consultants	58	26.85%
4.	National Lab./Uni.Lab.	48	22.22%
5.	Any other	5	2.31%

The total number of staff deployed in these R & D units is 6527 which gives an average of 37.09 persons per unit. The proposed information centre (NICHEM) should keep in mind this volume while organising its services.

Table 3a. Expenditure

Budget (Rs. in lakhs)	Below	1-10	11-25	26-50	51-100	101-above	Not given
Units.	21	49	16	7	10	14	99
Percentages for 216.	9.72	22.69	7.41	3.24	4.63	6.48	45.83
							100.00

Table 3b. Staff

Persons	1-20	21-50	51-100	101- above	Not specified.
Units	98	31	14	56	17
Percentages for 216.	45.37	14.35	6.48	25.93	7.87
					100.00

3. INFORMATION RESOURCES

Questions 11, 12, 14, 15 and 16 were formulated to ascertain the library facilities available with the organisations. Question 13 was included to find out the present methodology adopted by the organisations in meeting their information needs and question 18 was designed to ascertain information, documentation, translation and reprographic facilities available with the respondents. Replies received are discussed below.

3.1 Library Facilities

About 153 (70-83%) organisations reported that they maintained their own library. The library facilities indicating collection, staff and budget are given in Table 4. It will be seen from the table that a fairly large number of (53) organisations possess good collection ranging from 1000 to 10,000 volumes and about 12 units possess even bigger collection. The staff deployment and budget provisions appear to be quite adequate. A good number (19.61%) of libraries invest more than one lakh rupees in maintaining their library facilities. Around 50% of these libraries are well organised on modern lines and follow recognised systems of classification and cataloguing.

28 libraries offered inter-library loan facilities to other organisations. Percentage expenditure on library facilities as compared to their annual budget is not encouraging. As per data available (70 units) it works out to be 1.41% only. It can be concluded that although a majority of organisations have recognised the usefulness of a technical library and have tried to establish one in their own establishment, in many cases efforts are only half hearted. There is a conscious need of establishing a technical library at national level in the field which can co-ordinate and supplement the efforts of individual/local libraries.

Table : 4. Library Facilities Collection,Staff and Budget for 153 units.

Collection			Staff			Budget		
Category	No.	%	Category	No.	%	Category	No.	%
Below 1000	88	57.52	No.1-5	54	35.29	Below 1 lakh	60	39.21
1000-10000	53	34.64	No.6-10	14	9.15	1-5 lakhs	30	19.61
10000 above	12	7.84	No.11-20	4	2.61	6-10 lakhs	3	1.96
			No.21-50	2	1.31			
Not indicated	--	--	Not indicated	79	51.64	Not indicated	60	39.22

3.2 Documentation Facilities.

The question No.18 was put with a view to know the various types of information/documentation services offered by the organisations. Replies to this question alongwith the services needed are given in Table 5. About 153 libraries provide one or the other documentation/information services. Technical enquiries occupy the top position (42) followed by literature searches (35) and accession list and current awareness (34 each). There are comparatively smaller number (28) of libraries which offer inter-library loan facilities. This is hardly 18.30% of the total libraries. From Table 5 it is clear that documentation services are available only in very small number of libraries. Removing this deficiency needs immediate attention.

3.3 Meeting and Information Needs.

Question 13 was designed to ascertain as to how the organisations obtained their information requirements. Table 6 indicates that libraries are the major source of information. About 153 respondents made use of their own libraries and 134 organisations consulted local libraries.

National Laboratories and consultants also played major role as they assisted 53 and 48 organisations respectively. Around 47 respondents received information from INSDOC and 26 parties were helped by their collaborators in getting the information. This clearly indicates that library resources are the major source of supply of information and every effort should be made to augment this source. A comprehensive collection on the subject is desired to be established at national level i.e. NICHEM.

Table: 6. Meeting information requirements.

S.No.	Kind	No.	Percentage for 216 respondents.
1.	Collaborator	26	12.04
2.	Own Library	153	70.83
3.	Local Library	134	62.04
4.	Consultants	48	22.22
5.	INSDOC	47	21.76
6.	National laboratories	53	24.54

Table : 5. Library and Documentation,Reprographic and Translation Facilities : Available and Required.

S.No.	Kind	Services Available		Services Required	
		No.	%	No.	%
1.	1) Technical Enquiries	42	27.45	91	42.13
	2) Literature Searches	35	22.88	84	33.89
	3) Inter-library loan	28	18.30	81	37.50
	4) Current Awareness Services	34	22.22	77	35.65
	5) Abstracting Services	22	14.38	70	32.41
	6) Project Information Services	17	11.11	69	31.94
	7) Data Collection	20	13.07	50	23.15
	8) Information Services to top management.	32	20.92	49	22.69
	9) Data Services	8	5.23	33	15.28
	10) Selective dissemination of information (SDI)	15	9.80	24	11.11
	11) State of Art Reports etc.	10	6.54	23	10.65
	12) Digest Services	6	3.92	22	10.19
	13) News Briefs	19	12.42	20	9.26
	14) Press Clipping Services	21	13.73	20	9.26
	15) Express Information Services	10	6.54	17	7.87
	16) Accession List	34	22.22	--	--
2.	Translation Services	13	8.50	73	33.80
3.	Reprographic Services	35	22.88	64	29.63

NOTE: Percentage of services available is calculated for 153 units and percentage of services required is calculated for 216 responding organisations.

4. INFORMATION SERVICES REQUIRED BY THE USERS.

Replies to question 23 throw light on the adequacy or otherwise of the information services available with the respondents. Almost all the respondents have expressed their desire that the National Information Centre should provide one or the other information/documentation services to them. This shows that the information they had access to is not adequate. It will be seen from table 5 that technical enquiries (42.13%), inter-library loan (37.50%), current awareness services (35.65%), literature searches (33.89%), abstracting services (32.41%) and project information services (31.94%) are some of the better sought after services by the organisations. Proposed information centre for chemistry and chemical technology has to bear in mind these potential demands, while initiating documentation/information services. The documentation/information services ranked in order of their preferences according to replies received are as under:

1. Technical enquiries
2. Inter-library loan
3. Current awarness services
4. Literature searches
5. Abstracting services
6. Project inf.services
7. Data collection
8. Information services to top management.
9. Data services
10. SDI
11. State of art reports.
12. Digest services
13. News briefs
14. Press clipping services.
15. Express information services.

5. TRANSLATION SERVICES

5.1 Existing Services.

Only 13 organisations (8.50%) have translation facilities with them. This shows that the translation facilities available in the field are very meagre and need augmentation.

5.2 Required Services

About 73 organisations expressed their desire to get translation facilities from the proposed centre. This number represents 33.80% of the total replies received and is a further indicator that there is a potential demand for translation services in the field.

6. REPROGRAPHIC SERVICES

6.1 Existing Services

85 Organisations have indicated the availability of one or the other types of reprographic facilities with them. This represents about 39.35% of the total replies. It is an encouraging feature and an indication that there is awareness of reprographic services in the field. Question No.20 was designed to find out various types of reprographic facilities available with the organisations. Replies to this question are given in Table 7. It is seen from the table that photocopying/xeroxing (74.12%) and ammonia/diazo printing (58.82%) are the major facilities available with them. The microfilming (11.76%) and electrofax (3.53%) formed the next group. Microfiche Reader Printer (8.24%) microfilm reader (22.35%) and microcard reader (7.06%) are some of the equipment available with the respondents to read micrographics. It is apparent that there is awareness amongst the organisations of the usefulness of reprographic facilities as well as micrographic aids in the field.

Table : 7. Reprographic Facilities.

S.No.	Kind	No.	Percentage for 85 respondents
1.	Microfilming	10	11.76
2.	Photocopying/ Xeroxing	63	74.12
3.	Microfiche reader printer	7	8.24
4.	Ammonia/Diazo	50	58.82
5.	Electrofax	3	3.53
6.	Microfilm reader	19	22.35
7.	Microcard reader	6	7.06
8.	Others	5	5.88

6.2 Services Needed

It is observed from Table 5 that about 64 respondents (29.63%) have expressed their desire to receive reprographic services from the proposed centre. There are only 35 institutions (22.88%) who have shown their willingness to offer reprographic services to others. It shows that the facilities are inadequate with the institutions and there is a need to develop such facilities at the proposed centre to fulfil the demand of potential users.

7. OTHERS

7.1 Computer Facilities

The advent of computers has changed the mode of information search and dissemination in chemistry and chemical technology to a great extent. The complete Chemical Abstracts Services have been computerised and a number of machine readable files are also available from this source. In addition there are a number of Database Centres who offer computerised information retrieval services in the field. About 26 institutions (12.03%) possess some sort of computer facilities with them. But none of them use this facility for information retrieval purpose. These existing facilities could be used in developing information retrieval systems in the field.

7.2 Financial Support

As explained under para 1.2, we made personal visits to bigger industrial centres for collecting data. During the course of discussions, many organisations expressed their willingness to obtain information/documentation services from the centre on payment basis. Though it is premature to quantify the earnings at this stage, but the centre could be able to sell its services to a large number of organisations.

8. CONCLUSIONS

(i) The results of the survey conclusively indicate that there is a need for establishing a national information centre for chemistry and chemical technology.

(ii) Amongst the organisations who responded to the questionnaire, industrial units come first followed by R & D establishments and research institutions etc.

(iii) A large number of organisations possess R & D facilities with them and the staff engaged in these R & D units could be the potential users of the information/documentation facilities of the proposed centre.

(iv) Over 70% organisations possess library services. This shows that they are aware of the usefulness of library facilities and have tried to maintain it in their organisations. But these are inadequate and need augmentation through the establishment of a national information centre.

(v) Most of the organisations have shown their desire to receive information/documentation services from the proposed centre.

(vi) Translation facilities available with organisations are very meagre. A large number of the respondents indicated that the proposed centre should provide this service to them.

(vii) Reprographic facilities available with them are also not adequate. Wherever these services are available these are limited to their own collection and staff. A large number of them have expressed their desire to receive these services from the proposed centre.

ACKNOWLEDGEMENT

I am thankful to Dr. L.K. Doraiswamy, Director, NCL for according his approval to this proposal, in forwarding the same to the Department of Science and Technology for financial assistance and also for allowing me to publish this report. I am also thankful to the whole-hearted support of Major R. Thiagarajan, Director (I & D), Department of Science and Technology in obtaining the financial support of the Government. I am indebted to Dr. R.A. Mashelkar, Scientist 'F', NCL for his help in revising the final draft of the report.

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Appendix

SECTORAL INFORMATION CENTRE
FOR CHEMISTRY AND CHEMICAL TECHNOLOGY
(NISSAT PROJECT)

Users / Resources of Information Survey

(QUESTIONNAIRE)

(Please Print or Type in Capital Letters Only / Use extra sheet.)

1. Name of Institution / Firm / Industry

2. Mailing address

3. Established in (year)

4. Annual Budget Rs..................Lakhs

5. Area of major activity

☐ Acaedemic	☐ Industry
☐ R & D	☐ Public sector
☐ Public utility	☐ Small scale sector
☐ Consultancy	☐ Private sector
☐ Marketing	☐ Name any other....................

6. Name major subject(s) to which your activity covers ?

Primary interest

Secondary interest

7. How do you solve your R & D problems ?

☐ Your own set up ☐ Consultants ☐ Nat. Labs./Univ. Labs

☐ Collaboration (Foreign) ☐ Any other.............................

8. R & D Budget Rs..Lakhs

9. Staff (Please indicate the number only)
   - (a) MANAGERIAL
   - (b) R & D STAFF
     - i) Scientists
     - ii) Engineers
     - iii) Technicians
   - (c) MANUFACTURING / CONSULTANCY / MARKETING
     - i) Consultants
     - ii) Engineers
     - iii) Salesmen
     - iv) Technicians
     - v) Name any other....

10. In addition to the normal socio-economic, labour and legal problems, what are your major technical problems ?

☐ Testing ☐ Quality control ☐ Standardisation

☐ Name any other...

11. Do you have your own library ? YES / NO

12. If yes, what is the library budget ?

13. How do you meet your information requirements ?

☐ Collaborator ☐ Consultants ☐ INSDOC

☐ Local Libraries ☐ Own Library ☐ National Lab.

☐ Name any other...

14. Collections :

No. of Books No. of Current Periodicals

15. System of classification and cataloguing used for this collection.

16. What are major subjects covered in the Library collection ?

17. Do you have any specialised collection ? If yes, give extent, language and type of collection ?

18. Services offered

☐ Accession list

☐ Current awareness

☐ Translation

☐ Photocopying

☐ SDI

☐ Inter-library loan

☐ Literature searches

☐ Technical enquiries

☐ Abstracting services

☐ Information service to top management

☐ Express information service

☐ State-of-art, reviews etc.

☐ News-briefs

☐ Digest service

☐ Press clipping service

☐ Project information service

☐ Data collection

☐ Data service

☐ Name any other...

19. Do you provide services to other organisations ? If yes, give the details of charging schedule.

20. What reprographic facilities are available ?

☐ Microfilming

☐ Photocopying / Xeroxing

☐ Microfiche Reader-Printer

☐ Ammonia / Diazo

☐ Electrofax

☐ Name any other....................................

☐ Microfilm Reader

☐ Microcard Reader

21. What computer/unit record facilities are available ?

22. What is the major foreign language covering your interest ?

23. If you feel the facilities available to you are inadiquate, would you like to make use of the services offered by the proposed centre ? Please indicate your choice by ticking one or more below.

☐ Information service to top management

☐ Current awareness

☐ Translation

☐ Photocopying

☐ SDI

☐ Inter-library loan

☐ Literature searches

☐ Technical enquiries

☐ Abstracting services

☐ Express information service

☐ State-of-art, reviews etc.

☐ Digest service

☐ News-briefs

☐ Press clipping service

☐ Project information service

☐ Data collection

☐ Data service

☐ Name any other……………………………………………………………………

24. Library Staff (Please indicate the number only)
Supervisory
Professionals
Technicals
Others

Date :————— Signature—————

Place :————— Rank—————

N. B. 1. Please enclose a list of research projects, organisation chart, major publications and annual report and a list of currently received periodicals.

2. Please mail the completed form along with enclosures to :

R. S. SINGH Doc. Officer
National Chemical Laboratory, PUNE : 411 008

Annals of Library Science and Documentation
1981, 28(1-4), 54-63

SCIENCE, TECHNOLOGY AND DEVELOPMENT IN CHINA —SECONDARY SOURCES OF INFORMATION

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Many attempts have been made to compile bibliographies on various aspects of development of science and technology in China. In this contribution 88 such bibliographies have been listed under broad subject headings. A study has been made of their subjects, period of compilation and country of issue, which reveals interesting facts. Happenings inside China have influenced compilation of bibliographies on different subjects. For example, a bibliography on nuclear research in China was compiled in the U.S in the same year, when China exploded an atom bomb. Further, very little is known about the information activities in China, though "The Institute of Scientific and Technical Information of China", has been functioning for quite some time. Several bibliographies listed are of general nature. There is need to compile detailed annotated and up-to-date bibliographies on specific aspects of development in China.

INTRODUCTION

The People's Republic of China (PRC) is by far the world's largest developing country. Over the years it has developed sufficient indigenous scientific and technological capability, and successfully applied the results of research efforts for the socio-economic development of its masses. PRC has also made spectacular advances in high technology. For example, China exploded an atom bomb in 1964, and a hydrogen bomb in 1967. Further, China put into orbit a satellite in 1970. In 1980 China has successfully launched carrier rocket. In pure science also China is not lagging behind. Here, mention may be made of the success of Chinese scientists in synthesising biologically active insulin in 1965. It may be mentioned here that science in China has not yet reached the level of sophistication anywhere equal to that of western Europe or Japan. Now the PRC has started its modernisation programme and looks to West for help. Even though there are ideological conflicts in PRC it is generally accepted that China provides a model for other developing countries through the establishment of a research system based upon the country's own resources and oriented towards its development needs and problems. No wonder, the role played by science and technology in the socio-economic development of the PRC is now receiving more and more attention from various scholars working in different parts of the world.

Till recently, it was very difficult to get any first hand information on any activity in China. However, studies on China have been carried out in several institutions by different scholars. Also documents related to the development in various fields in China have been collected by research institutions for the benefit of scholars. It may be mentioned here that most of the Chinese language literature has been available to the outside world through the translation serials. Some of these western sources have been described by Erik Baark in his recent paper entitled "Selected Sources on Developments in China's Science and Technology Policy" /_ 1_7. He has divided the sources in two parts - primary and secondary. Under the secondary sources he has listed periodical publications reviewing developments on a monthly basis. However, other important secondary sources like bibliographies have not been surveyed. It is proposed to study some of the bibliographies covering Chinese and Western literature on science and technology in PRC. This, it is hoped, will provide better understanding on the availability of literature on science, technology and development in PRC.

METHODOLOGY FOR SELECTING BIBLIOGRAPHIES

Several attempts have been made to compile bibliographies on science, technology and development in China. A list of 88 such bibliographies has been compiled from the resources available in the Centre for Studies in Science Policy, School of Social Sciences, Jawaharlal Nehru University. In addition to this, the following bibliographies on China have also been scanned for locating relevant items:

1. Berton, Peter and Eugene, W.U. Contemporary China - A Research Guide ... Stanford: The Hoover Institution on War Revolution and Peace, Stanford University, 1967.
2. Dean, Genevieve C. Science and Technology in the Development of Modern China. London: Mansell, 1974.
3. Research Policy Library, Lund, and Research Survey and Planning Organization, New Delhi. Research Potential and Science Policy of the People's Republic of China - A Bibliography. New Delhi: Council of Scientific and Industrial Research, 1966.
4. Yuan, Tung-Li, China in Western Literature. New Haven: Yale University, 1958.

The Complete list is given in the Appendix.

LIMITATIONS

Only those bibliographies have been listed which have appeared in the English language irrespective of the fact whether or not their coverage is limited to English language publications. Thus English language bibliographies covering relevant literature published in Chinese, Japanese, Russian or any other language have also been included in the present compilation. No claim is made on the list being complete and comprehensive. It would be beneficial to all those interested in studying the role of science and technology in the development of PRC if information about these is shared. Any suggestion to improve the present efforts would be greatly appreciated.

SCOPE

Most of the bibliogrphies listed in the Appendix are general. Lists of scientific and technical periodicals from PRC have also been included. A bibliography listing western periodicals on China has also been included. General bibliographies like Tung-Li Yuan's "China in Western Lliterature" covering literature prior to the Revolution have been included in the present compilation to provide historical perspective. Because development in PRC cannot be viewed in isolation of what happened there prior to the Revolution. Further, the general bibliographies also list publications on science, technology and development.

Efforts have been made to cover almost all bibliographies listing scientific,technological and general literature reflecting on the overall development in China. Bibliographies on the Communist Chinese movement and on the leaders of the Chinese Communist Party have been included, as the same reflect on the philosophy behind the overall development policy in the PRC. The present compilation also includes some subject bibliographies on Agriculture, Education, Health Care, Manpower, Nuclear technology, etc.

Bibliographies listed here have been grouped under broad subject headings. Under each subject heading items have been listed alphabetically by author/title. A study has been made on the subjects of these bibliographies, period of issue and country from which these bibliographies have appeared.

SUBJECT/PERIOD-WISE DISTRIBUTION OF BIBLIOGRAPHIES

A study of the different subjects on which the bibliographies have been issued at a given time reveals the interest of the compilers or the countries from which these bibliographies have appeared on the various aspects of the development in China. Table - 1 below gives the subject/period-wise distribution of these bibliographies.

The present compilation includes 3 bibliographies of bibliographies and 15 lists of periodicals on science and technology plus 3 earlier editions of these lists. Actually these lists are holding lists of periodicals in different libraries. Most of these are general lists covering titles on different subjects. Some of these lists are specific to a subject depending on the specialisation of the institute from which it has been issued. For example, list of agricultural periodicals from China has been compiled by Leslie T.C.Kuo and Peter B. Schroeder under the title "Communist Chinese Perodicals in the Agricultural Sciences".

Seventeen bibliographies have been listed on the subject of science, technology and development in PRC. To this may be added 16 general

Table 1 - Subject/Period-Wise Distribution of Bibliographies

S. No.	Subject	Period of Publication Upto 1949	1950-54	1955-59	1960-64	1965-69	1970-74	1975-79	Total
1.	Bibliographies of Bibliographies	-	-	1	1	1	-	-	3
2.	Lists of Periodicals on Science & Technology	1	-	1*	10*	3*	1	2	18*
3.	General Bibliographies	-	3	2	3	2	4	2	16
4.1	Bibliographies of Chinese Communist Party	2*	-	-	2	-	-	-	4
4.2	Bibliographies of Chinese Leaders	-	3	2	1	-	-	-	6
4.3	Economic Policy, Planning and Development	2	1	3	5	-	1	-	12*
4.4	Science, Technology and Development	-	-	2	4	2	2	7	17
4.5	Education	-	-	-	1	1	1	-	3
4.6	Manpower	-	-	1	2	-	-	-	3
4.7	Mathematics	-	-	-	1	-	-	-	1
4.8	Nuclear Technology	-	-	-	1	1	-	-	2
4.9	Agriculture	-	-	-	1	-	1	-	2
4.10	Medicine and Public Health	-	-	-	-	-	2	1	3
4.11	Meteorology	-	-	-	1	-	-	-	1
4.12	Hydrology	-	-	-	1	-	-	-	1
		5*	7	12*	34*	10*	12	12	92*

*Includes 1st Editions

bibliographies which also cover related items. Other subjects being too specific, number of bibliographies on them are accordingly few.

It is, however, interesting to note the yearwise interest in the subjects on which the bibliographies have been compiled. For example, it was in 1964 that PRC exploded its first atom bomb and in the same year a bibliography on nuclear research in China was compiled in the United States. Further, it was in the year 1960-64 that maximum number of bibliographies have appeared in China. It appears that interest in the communist Chinese movement and their economic policy, planning and development was right from fifties through mid-sixties. Interest in the Chinese Agriculture, education and manpower, etc. has been more during the period of late 1950s through 1960s. In seventies the doors of China were opened to the western world, which resulted in an increased interest in the Chinese affairs. It was in this period that Chinese health care system for its masses attracted the attention of the western world and 3 bibliographies have since appeared on the subject. Science, technology and development in the PRC continue to be the interesting topics through the seventies if the number of bibliographies compiled is to be accepted as an index.

GEOGRAPHICAL DISTRIBUTION OF BIBLIOGRAPHIES

Being a closed society for a long time no bibliography that has been listed in the Appendix has appeared from China. It does not mean that there has been no bibliographic activity in China. Most of the bibliographies that have been listed have appeared from the United States. A countrywise distribution of these bibliographies is given in the Table II

Table 2 - Countrywise Distribution of Bibliographies on PRC

Country	No. of Bibliographies
Canada	1
France	2
Great Britain	6
Hong Kong	2
India	5
Japan	1
Sweden	5
USA	66
Total	88

Out of 88 bibliographies listed largest number totalling 66 have appeared from the United States. In the US again, the official agencies like the Library of Congress and the Department of State, etc. and the academic institutions like Hoover Institution, Columbia University, Harward University etc. have been responsible for issuing most of the bibliographies. Out of these 66 bibliographies 10 are lists of periodicals, 11 general bibliographies, 9 bibliographies on science, technology and development and the remaining 36 are on different subjects.

Second largest number of bibliographies totalling 6 have appeared from the Great Britain. Out of these 3 are lists of periodicals, 2 on science, technology and development and one on agriculture.

Five bibliographies have appeared from Sweden. Two of these are joint publications with Denmark. There is one more bibliography which has been published from India but actually is the joint effort of Research Policy Programme, University of Lund, Lund and Research Survey and Planning Organization, Council of Scientific and Industrial Research, New Delhi. Out of the 5 bibliographies published from Sweden, one is a list of periodicals and the remaining 4 are on science, technology and development. One of these 4 is an acquisition list by the Research Policy Institute, University of Lund, Sweden.

India has issued 5 bibliographies on PRC, out of which 3 are of general nature and the other 2 are on science, technology and developmnent. One of these is an outcome of a joint effort with the Research Policy Programme, of the University of Lund, Sweden. It may be mentioned here that a bibliography on science, technology and development in PRC has been compiled by Shri V.P. Kharbanda, of the Centre for the Study of Science, Technology and Development, Council of Scientific and Industrial Research, New Delhi. As the same has not yet been published it has not been listed in the Appendix.

Two bibliographies have appeared from France. One of these is a list of periodicals and another on industrialization in China. Both bibliographies have been issued by the Organization for Economic Co-operation and Development.

One bibliography has appeared from Canada on the subject of health care in PRC.

Two bibliographies on the economic policy, planning and developmnent in China have appeared from Hong Kong.

There may be many more countries having bibliographic control on the literature related to science, technology and development in PRC. These are not included in the present list either because they may be in a language other than English or the same have not been accessible at the time of compiling the present list. Any suggestions to improve and update the present effort would be much appreciated.

BIBLIOGRAPHIC ACTIVITY IN PRC

China has an efficient information system to collect, collate and disseminate scientific and technological information. This task is performed by "The Institute of Scientific and Technical Information of China" (ISTIC). The ISTIC was established in 1956 and is situated in the northern suburbs of Beijing. It presently employs approximately 1000 people. In addition to this 400 people are employed in a branch of ISTIC which was established in 1960 in Changging Sichuan province.

The ISTIC acts as a comprehensive National Centre for dissemination of Scientific and Technological Information. It is responsible for collecting and arranging scientific and technological information from China and abroad. It also carries out translation and reprographic work and issues periodical publications covering (a) reference material, e.g. abstracts of books and articles, and indexes, (b) translation of foreign publications etc. ISTIC also issues research reports intended for a limited audience at institution concerned (2).

In short, inside the country there exists an organised system to provide for bibliographic and information services to its scientists and technologists, etc. However, not much is known about these activities to the outside world.

CONCLUDING REMARKS

Most of the bibliographies listed here provide references to retrospective literature. The current publications are listed in an acquisition list issued by the Research Policy Institute of the University of Lund, Sweden, under the title "PRT China Acquisition List". This is a quarterly service. Each issue has an article on information activities about PRC. Also entries under China in the Annual Bibliography of Asian Studies is a valuable source of locating current literature.

At present very little is known about the information activities in China. It would be very rewarding if more and more information on the bibliographic activity within PRC is made known to the outside world.

Several bibliographies which have been listed are of general nature, covering literature on Science, Technology and Development. It would be beneficial to all if detailed annotated and uptodate bibliographies are compiled on specific areas of development in China. For example, latest bibliography on agriculture in China was published in 1971 and on Education in 1966. There is need to update these bibliographies and also compile comprehensive bibliographies on other aspects of development in PRC.

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SPECIAL LIBRARY SCENE OF HARYANA

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Factual information regarding the important special libraries of Haryana, obtained with the help of a questionnaire, has been presented. The problematic factors prevailing in these libraries and requiring timely consideration have been outlined. Certain suggestive measures for expediting efficient library services with minimum cost have been put forth.

INTRODUCTION

Haryana, the green land of India, is rich in special libraries, both quantitatively and qualitatively. Haryana has a number of research organisations like the National Dairy Research Institute, Karnal; Central Soil Salinity Research Institute, Karnal and many others. A library is attached to each and every research organisation. To obtain information regarding the condition of these libraries a questionnaire (Appendix J) was circulated, but only a few of them responded. Some of the libraries were, however, personally visited by the author.

The important special libraries of Haryana are :

1. National Dairy Research Institute Library, Karnal
2. Haryana Agricultural University Library, Hissar
3. Regional Engineering College Library, Kurukshetra
4. Government Medical College Library, Rohtak
5. Extension Education Institute Library, Nilokheri
6. Central Soil Salinity Research Institute Library, Karnal.

Besides these there are 7 technical libraries attached to 7 polytechnic institutions in Haryana. These are :

1. Haryana Polytechnic, Nilokheri
2. Government Polytechnic, Ambala City
3. Government Polytechnic for Women, Ambala City
4. Government Polytechnic, Sirsa
5. Government Polytechnic, Jahajjar
6. Chhotu Ram Polytechnic, Rohtak
7. Vaish Polytechnic, Rohtak.

Detailed information regarding these special polytechnic libraries has already appeared in IASLIC Bulletin 25(2) pp.57-67, June,1980. Hence there is no need to repeat the same here.

RESULTS OF SURVEY

Questionnaires (Appendix "J") were circulated among all the special libraries but only 6 libraries responded. The information, although based on the responses received from these six libraries only gives the overall picture of special libraries of Haryana.

Library Collection (Appendix "A")

In book collection, Nehru Library of Haryana Agricultural University, Hissar, established in 1962, tops the list, stocking the largest collection of 1,05,463 volumes. In periodical collection, the National Dairy Research Institute Library, Karnal tops the list stocking 13,479 bound sets of back volumes of periodical publications. The smallest collection was seen in the Extension Education Institute Library, Nilokheri stocking about 4,500 volumes. Only a few bound sets of back issues of periodical publications figure in its entire collection.

In periodical subscription (current) Haryana Agricultural University Library tops the list subscribing to 1,400 periodical publications. This is followed by National Dairy Research Institute Library, Karnal subscribing to about 625 periodical publications. Extension Education Institute Library subscribes to about 25 periodical publications only.

Nature of the book as well as periodical collection differs from library to library depending upon their respective areas of coverage as, for instance, NDRI Library covers Dairy Science, hence its collection is on Dairy Science. Similarly in HAU Library, the coverage is Agriculture and hence its collection on Agricultural Sciences.

Technical Processing (Appendix "B")

Libraries of NDRI and CSSRI follow UDC scheme for classification purposes. Libraries of HAUL and RECL follow DDC scheme for the purpose. For cataloguing, the libraries of NDRI, HAUL and CSSRI follow CCC and RECK library follows ALA Rules. Collection is not fully processed in Extension Education Institute Library, Nilokheri, that adopts CC for classification and CCC for Cataloguing purposes. Medical College Library, Rohtak follows A A C R for cataloguing and DDC for classification purposes.

Circulation Processes (Appendix "B")

Libraries of HAUL, CSSRI, NDRI follow Browne system for issue and return of books. CSSRI and MCR Libraries follow Newark system & EEI Library follows ledger system for the purpose. The average circulation rate per day is maximum in NDRI Library and that is 2,500 issues and 2,000 returns per day. NDRI Library is followed by HAU Library where the ratio is 250/300:250/300. Minimum average circulation ratio is seen in the libraries of CSSRI and EEI where it is 30:25 and 10:10 respectively. In RECK Library the ratio is 250:230.

Library Hours (Appendix "C")

a) Working hours in these libraries differ from library to library. In NDRI library the working hours are 16, the maximum of all, followed by HAU Library with 13 hours on all working days and 7 hours on Sundays and other holidays. The working hours are minimum i.e. 7, in EEI Library, where they work during the office hours i.e. from 9.00 a.m. to 4.30 p.m. with 1 hour lunch break.

b) Peak hours of these libraries differ from library to library. In NDRI Library the peak hours are from 11.a.m. to 1 p.m., in RECK Library these are from 4 p.m. to 6 p.m in HAU Library from 10 a.m. to 11 a.m. and from 4.30 p.m. to 6.30 p.m., in CSSRI Library from 11 a.m. to 1 p.m. and in EEI Library from 12.30 to 1.30 p.m.. 12 to 2 p.m. are the peak hours in Medical College Library, Rohtak.

Access System

All the libraries follow open access system, except EEI Library, where it is closed access.

Clientele Strength (Appendix "D")

The number of clientele is maximum in HAU Library, where it is 3,540, followed by NDRI Library having a clientele strength of 1,715 comprising of 250 scientists, 250 technicians, 800 students and 415 others. The clientele strength is minimum in CSSRI and EEI Libraries where it is 80 and 20-25 respectively.

Library Building (Appendix "E")

NDRI and HAU have separate buildings for their libraries where as the libraries of RECK, CSSRI, MCR and EEI are housed in some other department/section of the organisation/institute, HAUL has the largest seating capacity for 650 readers, followed by NDRI Library having a seating capacity for 250 readers.RECK Library has a seating capacity for 128 readers. Minimum seating capacity is seen in the libraries of CSSRI & EEI where it is 35 and 15 respectively. MCR Library has a seating capacity for 100 readers.

Library Sections (Appendix "F")

The libraries of NDRI, HAUL, RECK, MCR and CSSRI have set up their acquisition sections, technical sections and periodical sections. Binding section has been set up in HAU Library only. No such sections were found in EEI Library.

Library services

All the libraries except EEI Library have provisions of reference service. Simple documentation services such as xerox and other reprographic services are also provided by these libraries.

Library Staff (Appendix "G" & "H")

HAU Library has a maximum staff strength of 40 with 9 professionals, 18 semi-professionals and 13 non-professionals, followed by the libraries of NDRI and RECK where it is 18 in each.The staff strength of CSSRI is 5. EEI has only as single do-all librarian.

a) Librarian : Qualifications, Grade & Status of librarians differ from library to library depending upon the nature and type of the organisation to which these are attached. However, these are in tune with the entire organisational set up. Librarians are well qualified, professionally as well as academically. Almost every librarian is with a Masters degree in Library Science.

b) Library Supervision : Overall library supervision, in almost all these special libraries, lies in the hands of the librarian and he is directly answerable to the Head of the organisation/institution. In EEI Library, however they have made a non-professional as officer in-charge of library. The situation is really pitiable when they have got a professionally qualified librarian with them.

Library Budget (Appendix "I")

HAU Library has a maximum annual budget that ranges from 12-15 lakhs of rupees annually, followed by NDRI and MCR Libraries where it is 10 lakhs in each. The budget of RECK Library and CSSRI Library is 1,34,000 and 1,80,000 respectively. All these libraries exhaust maximum percentage of their annual budget on periodical subscription.

CSSRI Library, for instance, spends about 70% of its annual budget on periodical subscription only.

PROBLEMS

On the basis of survey conducted and personal visits to some of these special libraries and interviewing their clientele, the author could observe following problematic factors prevailing in these libraries, requiring timely consideration to overcome them.

1. a) There seems to be a considerable time-lag between the publication of a document and its receipt in the library; and
   b) There seems to be considerable time tag between the receipt of a document in the library and its actual display on the shelf
2. Non-professionals outnumber professionals in almost all these libraries.
3. Lack of subject specialization among staff members serving in these special libraries was observed. Persons with arts background serve in these special and scientific libraries.
4. Adequate back log of work was observed in almost all the libraries due to inadequate staff strength.
5. Libraries do not have separate buildings in some of the very important organisations/institutions.
6. Lack of uniformity in various library practices carried out in these libraries was observed.
7. Libraries do not cooperate with one another in various areas of cooperation.
8. Librarians and other library staff members do not get proper status and salary scales in most of the libraries.
9. Users are not aware of most of the services their libraries render.

SUGGESTIONS

1. All these libraries, especially the ones with similar areas of study and research must mutually benefit from each other by sharing their resources under certain set agreed terms and conditions.
2. Persons with relevant subject back ground and professional qualifications only must be recruited for carrying out professional jobs in these libraries and the already serving non-professionals must be deputed for undergoing professional training.
3. Librarians and library staff members must be encouraged to attend professional meetings, seminars, conferences, thereby giving them an opportunity to understand the profession and acquint themselves with the latest trends in the profession for developing their libraries on modern lines.
4. As far as possible, separate buildings for the libraries be established. Library buildings, easily accessible to their respective clientele, be constructed on certain set standards and norms laid down for the purpose.
5. Clientele be made aware of the services that their libraries render.
6. Services like CAS & SDI etc. be introduced in every special library without any further delay.
7. A documentation unit rendering various documentation services like Indexing, Abstracting, Translation, Reparography etc. be set up in each and every special library. Nominal or no charges be charged for such services from the clientele.
8. Librarians must familiarize themselves with the problems of the clientele and must find methods to overcome the same. This can be done by frequent and fruitful discussions between the librarian and the representatives of the clientele.
9. There should be periodical meetings of all these librarians, wherein they should dis-

cuss various library problems and find methods/alternatives to improve the library services, and their respective parent bodies should encourage and sponsor such meetings.

10. Publication of Union Catalogue of the holdings of these libraries may be undertaken by any of these libraries that is more resourceful, and same may be circulated among the participating libraries. The ideal library to take up this job is NDRI Library.

ACKNOWLEDGEMENT

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List of Abbreviations used

Sl No	Abbreviations	Full Form
1.	A A C R	Anglo-American Cataloguing Rules
2.	A L A R	American Library Association Rules
3.	A S	Acquisition Section
4.	B S	Binding Section
5.	C C	Colon Classification
6.	C C C	Classified Catalogue Code
7.	C S S R I L	Central Soil Salinity Research Institute Library, Karnal
8.	D D C	Dewey Decimal Classification
9.	D S	Documentation Section
10.	E E I L	Extension Education Institute Library, Nilokheri
11.	H A U L	Nehru Library, Haryana Agricultural University, Hissar
12.	N A	Not Available
13.	N D R I L	National Diary Research Institute Library, Karnal
14.	P S	Periodical Section
15.	R E C K L	Regional Engineering College Library, Kurukshetra
16.	R S	Reference Section
17.	T S	Technical Section
18.	M C R	Medical College Library, Rohtak

APPENDIX "A"

COLLECTION

Sl No	Name of the Library	Year of Establishment	Book Collection	Bound Periodicals	Currently Subscribed Periodicals	Others
1.	NDRIL	1956	32789	13479	625	6500
2.	HAUL	1962	105463	40534	1400	2192
3.	RECKL	1967	32070	2732	152	6821
4.	CSSRIL	1969	8500	3900	226	--
5.	EEIL	N.A.	4500	-	25	500
6.	MCLR	1962	39000	13200	451	7

APPENDIX "B"

TECHNICAL PROCESSING & CIRCULATION ACTIVITIES

Sl No	Name of the Library	Classification Scheme used	Catalogue Code adopted	Circulation System adopted
1.	NDRIL	UDC	CCC	Browne
2.	HAUL	DDC	CCC	Browne & Newark
3.	RECKL	DDC	ALA	Browne
4.	CSSRIL	UDC	CCC	Newark
5.	EEIL	CC	CCC	Ledger
6.	MCLR	DDC	AACR	Newark

APPENDIX "C"

LIBRARY HOURS, TIMINGS & PEAK HOURS

Sl No	Name of the Library	Library Hours	Timing in Summer	Timing in Winter	Peak Hours
1.	NDRIL	16	N.A.	N.A.	1100 to 1300 hrs and 1800 to 2000 hrs
2.	HAUL	13	0700 to 2000 hrs	0830 to 2130 hrs	1000 to 1100 hrs and 1630 to 1830 hrs
3.	RECKL	11	0700 to 1300 hrs	0830 to 1900 hrs	1600 to 1800 hrs
4.	CSSRIL	9	0900 to 1800 hrs	0900 to 1800 hrs	1100 to 1300 hrs
5.	EEIL	6½	0900 to 1630 hrs	0930 to 1700 hrs	1230 to 1330 hrs
6.	MCLR	12	0700 to 1400 hrs & 1600 to 2100 hrs	0900 to 2100 hrs	1200 to 1400 hrs

APPENDIX "D"

CLIENTELE

Sl No	Name of the Library	Total Strength of the Members	Scientists	Technicians	Students	Others
1.	NDRIL	1715	250	250	800	415
2.	HAUL	3540	N.A.	N.A.	N.A.	N.A.
3.	RECKL	1695	-	-	1465	230
4.	CSSRIL	80	70	10	--	-
5.	EEIL	15-20*	-	-	--	15-20
6.	MCLR	978	100 (teachers)	-	753	125

*Depending upon the number of participants attending the course

APPENDIX "E"

LIBRARY BUILDING, SEATING CAPACITY & CIRCULATION RATE

Sl No	Name of the Library	Library Building	Seating Capacity for	Average Issue per day	Average Returns per day
1.	NDRIL	Separate	250 Readers	2500	2000
2.	HAUL	Separate	650 Readers	250-300	250-300
3.	RECKL	Attached	128 Readers	250	230
4.	CSSRIL	Attached	35 Readers	30	25
5.	EEIL	Attached	15 Readers	10	10
6.	MCLR	Attached	100 Readers	75-80	70-75

APPENDIX "F"

LIBRARY SECTIONS

Sl No	Name of the Library	AS	IS	PS	RS	DC	BS
1.	NDRIL	Yes	Yes	Yes	Yes	-	-
2.	HAUL	Yes	Yes	Yes	Yes	Yes	Yes
3.	RECKL	Yes	Yes	Yes	Yes	Yes	-
4.	CSSRIL	Yes	Yes	Yes	-	Yes	-
5.	MCLR	Yes	Yes	Yes	Yes	Yes	-

APPENDIX "G"

LIBRARY STAFF

Sl No	Name of the Library	Total	Professional	Semi-Professional	Non-Professional
1.	NDRIL	18	6	2	10
2.	HAUL	40	9	18	13
3.	RECKL	18	3	2	13
4.	CSSRIL	5	2	1	2
5.	EEIL	1	1	-	-
6.	MCLR	7	1	1	5

APPENDIX "H"

LIBRARIAN

Sl.No	Name of the Library	Librarian's Qualification	Grade	Status
1.	NDRIL	B.Sc., M.Lib.Sc.	1100-1600	T - 7
2.	HAUL	M.A., M.Lib.Sc.	1500-2000	University Professor
3.	RECKL	M.A., M.Lib.Sc.	700-1300	Administrative
4.	CSSRI	M.A., D.Lib.Sc.	700-1300	Jr. Class I
5.	EEIL	B.Sc., M.Lib.Sc.	425-700	Clerical
6.	MCLR	M.A., M.Lib.Sc. LL.B.	300-600	Clerical

APPENDIX "I"

LIBRARY BUDGET

Sl.No	Name of the Library	Annual Budget in Rupees	Expenditure on		
			Books	Periodicals	Miscellaneous
1.	NDRIL	10,50,000	4,00,000	6,00,000	50,000
2.	HAUL	15,00,000	7,01,000	6,75,000	1,24,000
3.	RECKL	1,34,000	46,000	54,000	34,000
4.	CSSRIL	1,80,000	50,000	1,25,000	5,000
5.	EEIL	2,000-3,000	1,000	1,000	1,000
6.	MCLR	10,00,000	3,00,000	4,50,000	2,50,000

APPENDIX "J"

QUESTIONNAIRE

Purpose : To survey special libraries of Haryana

Note : i) Please tick mark only wherever appropriate

ii) Attach a separate sheet if required

1. Name of the Library ____________________
2. Year of its establishment ____________________
3. Parent institution for boys/girls/both/any other type ____________________
4. Place where located ____________________

____

____

5. Librarian's :
   - a) Qualifications ____________________
   - b) Grade ____________________
   - c) Status ____________________

6. Library staff strength :
    a) Professionals ____________________
    b) Semi-Professionals ____________________
    c) Non-Professionals ____________________

7. Total strength of members ____________________

8. Nature of members with exact number :
    a) ____________________
    b) ____________________
    c) ____________________
    d) ____________________

9. Average number of daily visitors : ____________________

10. Strength of collection :
    a) Books ____________________
    b) Bound periodicals ____________________
    c) Currently subscribed periodicals ____________________
    d) Others ____________________

11. Total sections in the library ____________________
    a) ____________________
    b) ____________________
    c) ____________________
    d) ____________________

12. Library follows open/semi-open/closed access system ____________________
____

13. Library remains open for ________ hours ________
Timing in summer ________ & in winter ________
Peak hours in the Library ____________________

14. Collection classified by DDC (With ed.)/CC/UDC ____________________
____
____
____

15. Collection catalogued by AACR/CCC/Any other code ____________________
____

16. Circulation system adopted ____________________

17. Average daily issues ________ & returns ________

18. Annual budget of the Library Rs. ________ which is ________ of the total budget for the parent institution
____

19. Allocation of budget on :
    a) Staff salaries ______
    b) Book collection ______
    c) Periodical collection ______
    d) Equipment and furniture ______
    e) Miscellaneous ______

20. Library renders services such as :
    a) ______
    b) ______
    c) ______
    d) ______

21. Library organises functions such as professional/cultural/any other ______

22. Library housed in attached/separate/rented/own building ______

23. Seating facilities for the readers ______

24. Overall supervision of the library lies with ______

25. Problems (if any) faced by the Librarian ______

26. Suggestions (if you wish) for enhancement of the library services ______

Dated :

Thanks for the cooperation

Signature with
Stamp of the Librarian

(M/s Kasturi and Sons Ltd., Madras) and 'Khadi Gramodyog Annual Number 1980' (Khadi and village Industries Commission, Bombay) are a few examples of this category of publications.

Report of any kind issued by organisations associated with industrial development may serve as an important source of industrial information. However, under this paragraph only the present status of the annual reports of the Directorate General of Technical Development, Ministry of Industry; Ministry of Petroleum, Chemicals & Fertilizers; Ministry of Steel and Mines and Small Industries Development Organisations (SIDO) are discussed. These reports are very good sources of information. Since 1975-76 the DGTD has not issued any report. After 1979 SIDO has also not brought out any annual report. Other ministries, mentioned above, have been regularly bringing out their annual reports.

Though there has been an exponential increase in the rate of dissemination of knowledge in various disciplines of science and technology, and more and more primary and secondary journals and other publications have come into existence, there is still a dearth of standard industrial periodicals. In the present context, only periodicals general in scope are taken into consideration.

Generally, much sought after information like future scope of the industry, market potential of various products or their price, latest techno-economic data, industrial management etc. is missing or at best finds scanty coverage in these publications.

All these journals can be classified into following groups: (i) Business, finance and trade journals, e.g., Capital, Calcutta; Commerce, Bombay; Indian Trade Journal, Calcutta; etc., (ii) Techno-economic journals, e.g. Economic Scene, Bombay; Eastern Economist, New Delhi and Economic Trends, New Delhi, (iii) News Journals e.g. Chemical Industry News, Bombay; Chemical Times, Bombay; Economic and Commercial News, New Delhi; Engineering Times, Calcutta; and Industrial News Digest, New Delhi, and (iv) Technology journals, e.g. Research and Industry, New Delhi; and Chemical Age of India, Bombay. However, this grouping is not a water-tight compartmentalisation. This is, in fact, not possible due to overlapping scope of these publications.

Ephemeral publications like commercial and economic newspapers play a vital role in the dissemination of industrial information. In fact, these are the only sources which present the status of the Indian industries frequently. Papers falling in this category of publications are 'Business Standard', Calcutta; 'The Economic Times', New Delhi; and 'The Financial Express', New Delhi.

Guide to Published Sources - As mentioned earlier, the published industrial information sources are scarce and scattered. In these circumstances unless knowledge of the varieties of information sources, their scope and limitations, reference characteristics, ease of use, etc. is available, selection of a right information source becomes difficult. In such a situation, a sourcebook or a guide to these scattered sources may prove useful. It is needless to say that such guide should be well indexed keeping in view all sorts of queries. There is no such publication available in the country at present.

Limitations - In the process of this introductory survey of the published sources of industrial information some drawbacks and limitations have emerged. Most of the useful publications are backdated by 3-5 years. Moreover, information on a particular item reported in two different publications often do not tally, thus adding to confusion.

ORGANISATIONAL SOURCES

A variety of organisations are involved in or related to the development of industries in India. They are actively generating/collecting/disseminating or distributing industrial information and thus serve as important sources of information.

There are a large number of organisations which are directly or indirectly related to industrial development. To discuss all these diverse organisations with sweeping scope in a limited space would be a difficult task. In this paper only selected and important organisations are discussed.

In the absence of any standard classification practice for this type of work the evolution of some suitable classification or grouping for these organisations is necessary for the convenience of discussion. Besides national organisations, some international and regional organisations are involved in the industrial development of a country. It, therefore, proved handy to divide all the organisations into two broad groups: (i) International Organisations, and (ii) National Organisations. Further subdivisions within these groups can be done on the basis of the scope and functions of the organisations (most of the organisations serve more than one purpose, therefore, a water-tight compartmentalisation is not possible).

Thus, the 'International Organisations' can be divided into: (i) UN Agencies, e.g. UNCTAD, UNDEP, UNIDO, etc., (ii) Organisations for Economic Development, e.g. ESCAP, OECD and World Bank Group, (iii) R&D Organisations, e.g. Intermediate Technology Development Group Ltd., International Tin Research Council, International Wool Secretariat and Tropical Products Institute, (iv) Information Services/Centres, e.g. INDIS, INTIB, ISONET, FID Committee on Information for Industries, and World Federation of Engineering Information/Committee on Engineering Information, (v) Organisations for Standards and Patents, e.g. ISO, INPADOC, International Patent Institute, and WIPO, (vi) Trade Centres, e.g. International Trade Centre and World Trade Centre, (vii) Chambers of Commerce and Trade Associations, e.g. International Chambers of Commerce.

Similarly the 'National Organisations can be subdivided into (1) Planning, Policy-making and Executive Bodies, (2) State Directorates of Industries, (3) Industrial Development Corporations, (4) Quality Control Organisations, (5) Institutions for Industrial Financing, (6) Commodity Boards and Other Bodies, (7) Export Promotion Organisations, (8) Statistical Organisations, (9) Research Organisations, (10) Technology Transfer Centres, (11) Rural and Appropriate Technology Centres, (12) Testing Centres, (13) Consultancy Organisations, (14) Training Institutions, (15) Technological Institutions, (16) Libraries, Information Services and Centres, and Museums, (17) Trade Centres, (18) Small Industries Service Institutes, (19) Productivity Councils, (20) Chambers of Commerce and (21) Industrial Associations.

Because of the overlapping, or dual functions of the organisations falling under it, the first chapter, viz. 'Planning, Policy-making and Executive Bodies' is made a very broad one. It will cover all the ministries and their departments and organisations, including promotional, regulatory and advisory offices, concerning with industries, besides, Ministry of Finance, Planning Commission, etc.

Under the 'Quality Control Organisations' apart from ISI, organisations like the Central Drugs Standard Control Organisation, Directorate of Marketing and Inspection, Research, Designs and Standard Organisation, etc. can come.

A variety of organisations can be put under the 'Export Promotion Organisations'. Important among them are: export promotion councils, Export Inspection Council of India, Indian Institute of Foreign Trade, Indian Institute of Packaging, MMTC, STC, Trade Development Authority, and Trade Fair Authority of India.

Apart from covering all the institutions (e.g. C.S.O., Directorate General of Commercial Intelligence and Statistics) involved purely in statistical or data work, the 'Statistical Organisations' may cover DGTD, State Directorates of Industries, SIDO, export promotion organisations, manufacturers' associations, etc.

Research Organisations can further be subdivided into a number of groups such as Central government organisations, State government organisations, Private organisations, R&D centres of industries, etc.

Training institutions and technological institutions can come under one group. However, it is more appropriate to deal with academic institutions separately. Other groups are self-explanatory.

Guide to Organisational Information - Information regarding above mentioned organisations is not only widely scattered but in many cases awfully inadequate. In view of the importance of these organisations as sources of information, there is a crying need for a directory which could provide the particulars of these organisations. At present, no such directory is available in the country which covers all these organisations.

At the end, it will be pertinent to draw attention to the 'generation gap' that we face in the Indian Industrial information scene. Though a number of organisations are involved in generating, gathering and disseminating such information, almost all of them issue only printed products. Most of the published sources discussed in the first part of this paper are brought out by one or the other organisation falling under the scope of the second part of the paper. As discussed earlier, by the time they are available in print, most of the information contained in them becomes back-dated. With the growing demand for industrial information and increase in the information that need to be gathered, sifted, and communicated to the right users, it becomes necessary that we in India adopt the latest information technologies, such as computerized information storage, on-line interactive search techniques, etc. No doubt we have the expertise both in computer technology and in communication technology. In fact, in the fields like agriculture and nuclear science, we have already made a beginning in this direction. A little effort can also bring the expertise available to work on a national programme for modernizing the industrial information activities of all the major organisations involved in the industrial development.

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CONCEPT SPECIFICATION IN DEWEY DECIMAL CLASSIFICATION: A REPORT OF A PILOT PROJECT ON LITERATURE

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The conventional approaches of classifying documents on Literature according to DDC showed certain drawbacks while retrieving all the concepts dealt in the document to scholars of the discipline. This was due to certain non-conventional approaches of the scholars as well as publishers. An analysis into their approaches was made and modifications to the DDC notation were suggested keeping the order of the notation as far as practicable intact. The users' reactions to the new procedures showed encouraging results.

0. INTRODUCTION

One of the major qualities of a good classification scheme is its expressiveness, both through its notation and its mode of subject representation. In other words, it must be able to specify explicitly the general idea (i.e. concept) contained in each document for an effective organisation of information in a retrieval system. Dewey Decimal Classification (DDC) with its wide range of applicability and usefulness was found to be suitable for organization of large collections of documents in academic libraries and maintains its interesting feature of grouping of documents by discipline. But in the field of Literature, because of its very nature, the subject relationships are fundamentally different.

1. SCOPE OF THIS PAPER

Specification of each and every concept that lies within a document in literature is somewhat different from that in other traditional disciplines. Various problems were faced (see sec.2) while processing the documents on literature, which resulted in the initiation of a Pilot Project at the Central Library of the Berhampur University Library System, in July 1977, to study and solve such problems. This is a report on the working of this project after 3 complete academic years of observation (upto July 1980). It reports on the analysis of the various day to day problems faced, and the necessary solutions adopted with suitable examples, and points out some of its advantages and limitations.

2. PROBLEMS OF INFORMATION RETRIEVAL

While classifying documents on literature according to the available provisions of DDC certain problems were faced, mainly from the point of view of retrieving the appropriate document/information. This was due to some non-conventional approaches of both the users and the publishers. An analysis into their approaches was thus made.

2.1. Analysis into the non-conventional methods of publications.

The DDC system recognises certain conventional methods of publication, but since the publishers do not strictly follow these methods, it was felt that a single class number cannot suffice, since more than one variety of books are published in a single volume in the form of *artificial composite book*. Some of the non-conventional methods are as follows:

a. one or more titles of a single form of different authors of single or different periods with or without a common title,

b. one or more titles of different forms of different authors of single or different periods with or without a common title,

c. one or more titles of different forms of a single author with or without a common title,

d. one or more specific works of a single author with the biography/criticism (the biography/citicism having been published elsewhere as a separate book) about him by other authors,

e. specific work of a single author with the criticism/comment (the criticism/comment having been published elsewhere as a separate book) on the work by other authors,

f. works of more than one form of a single author with the criticism/comment (the criticism/comment having been published elsewhere as a separate book) about him by other authors, etc.

2.2. Analysis into the users' enquiries

The daily enquiries of the users' were recorded in slips and analyses into their approaches were made. The following are the approaches through which the users asked for the documents. The list only shows the verified and corrected approaches.

Literature in general

a. Literature in general

b. Literature, collection, specific period

c. Literature, collection, form

d. Literature, collection, form, specific period

e. Literature, criticism

f. Literature, criticism, specific period

g. Literature, criticism, form

h. Literature, criticism, form, specific period

Specific literature

i. Specific literature in general

j. Specific literature, collection

k. Specific literature, collection, specific period

l. Specific literature, criticism

m. Specific literature, criticism, specific period

n. Specific literature, form

o. Specific literature, form, collection

p. Specific literature, form, collection, specific period, more than one author

q. Specific literature, form, criticism

r. Specific literature, form, criticism, specific period, more than one author

s. Specific literature, form, criticism, specific period, single author, (on) single work

t. Specific literature, form, criticism, specific period, single author, (on) collected works

u. Specific literature, form, criticism, specific period, (on) single author

v. Specific literature, form, collection, more than one period, more than one author

w. Specific literature, form, criticism, more than one period, more than one author

x. Specific literature, form, specific period, single author, single text

y. Specific literature, form, specific period, single author, collected text.

3. IDENTIFICATION OF OBJECTIVES

The foregoing analysis of the non-conventional methods of publications and the approaches of the users' enquiries helped us to formulate the basic objectives on which this project was based. The objectives were:

i) to individualise the work of a specific author,

ii) to specify the works by an author from the works about and for him of a specific period,

iii) to classify criticisms/biography on more than one author of a specific period published in a single volume,

iv) to classify criticisms/biography on more than one author of more than one period published in a single volume,

v) to classify texts of more than one author of a specific period published in the form of an artificial composite book.

vi) to classify texts of more than one author of more than one period published in the form of an artificial composite book,

vii) to classify texts having specific scope of more than one author of more than one period published in a single volume,

viii) to classify texts having specific scope of more than one author of specific period published in a single volume,

ix) to specify criticisms of single authors from their texts, etc.

4. REPORTS OF THE PREVIOUS WORKS AND DDC PROVISIONS

After identifying the objectives of the project, an investigation was made to find out the provisions in DDC and the reports of the previous works done on the subject. The analysis of the non-conventional methods of publications and the approaches of the users' enquiries were matched with the class numbers of the DDC 18th edition to measure the provisions given in the scheme to classify such documents. Table 1 gives the provisions of DDC.

After this an investigation into the variations to recommended practices in DDC was made to see the feasibility of their application to the various problems faced in the work. The recommendations are given below.

i) alphabetical arrangement of authors under each language by appropriate book number,

Table 1. Provisions in DDC Scheme

Sl. No.	Nature of analysis	Points of approach	Provisions in DDC	Comments
I	Non-conventional methods of publications	a to c	Nil	-
		d to f	Partial	classified without subdivision under a specific period
II	Users' enquiries	a to h	Full	-
		i to o	Full	-
		p	Nil	-
		q	Full	-
		r	Nil	-
		s to u	Partial	classified without subdivision under specific period
		v to w	Full	-
		x to y	Partial	classified without subdivision under a specific period

ii) direct alphabetical arrangement of authors under literature,

iii) application of letters or artificial digits,

iv) classifying primarily by period, then form where appropriate, and

v) ignoring the distinction of 810 and 820.

The adoption of the above variations to the recommended practices was not found suitable for various reasons, for example adoption of the first variation ignores form and period; adoption of the second variation ignores language, form and period etc. At the same time adoption of the sub-divisions and notation given for Shakespeare for all other authors could not solve all the problems and was not suitable for various other reasons.

5. METHODOLOGY

5.1 Data collection

i) User participation in random sampling

Users were asked to provide sample books on literature randomly from the stacks to avoid any bias of the staff while choosing the books.

ii) Staff knowledge

The knowledge of the staff of the Central Library and other departmental libraries was considered and their day to day problems for tackling requests and books on literature were recorded.

iii). Curriculum contents of universities

Curricula of both undergraduate and post graduate studies of different universities were scanned so as to find out their approach in dividing the literature into different study units or areas and their relevant features were recorded.

iv) Educational consensus

Opinion of some professors, research scholars, and other persons engaged in the post graduate teaching department of the study of literature were sought in the form of questionnaire and in some cases, through personal interviews regarding the trend in teaching practices in literature and the possible breakdown of the concepts of literature into various units of study.

5.2 Recording, filing and control

The books which were randomly sampled from the stacks were recorded, classified according to the provisions of DDC, 18th edition in specially designed slips. A sample of the slip is given below.

T.P.: Area No. __

Annotation:

Analysis:-

Class No	Original DDC No	Adopted DDC No

Filing Usual ☐ Special ☐

No of digits Original ______ Adopted ____

Extra no of cards in catalogue ________ Signagure

Date:

Fig 1. Example of a slip

The slips were arranged according to the serial number (area wise) in specially designed containers and the necessary author, reference catalogue cards were prepared according to the usual practices of AACR '67. A separate shelflist was maintained for this purpose for a comparative study with the shelflist of the library collection.

6. CRITERIA AND CONDITIONS

After this certain criteria and conditions were laid down for the working of the project. The most important criterion was, as far as practicable, not to break the natural order of the DDC notation. Other conditions were, i) no limitation on the number of digits after decimal point, ii) books published in English script only were considered, iii) biography of literary persons were classifiec under literature class (i.e. 800) not under biography (i.e. 928), and iv) place of birth of an author has been strictly followed for deciding his/her nature of authorship, for example, T.S. Eliot and George Bernard Shaw were classified as American and Irish authors respectively.

7. AREAS OF INVESTIGATION

In this section each area of problems are dealt in the following order:

i) Nature of the problem

ii) Examples from the sample

iii) Shelflist card (emphasis should be given on the class number)

iv) Comments, if any.

Area no 1: To classify specific literature, specific form, specific period, individual author, single text

Example 1 : Death in the afternoon/Ernest Hemingway/Penguin Books [1976] [The stroke/sign is used in the examples to separate the two units or two different types of information in a title page]

813.5 Hemingway, Ernest Miller,
HEM 1899-1961.

Death in the afternoon, by
Ernest Hemingway [London]
Penguin Books [1976]

The class number in the above example has been divided into three parts, such as

i) The DDC notation for American fiction, modern period (original DDC number)

ii) First three capital letters of the surname of the author (adopted number)

iii) First three small letters of the title (adopted number).

If the first three letters of the title do not form a single word, a comma has been used after the first word to indicate the beginning of the second word. However, the comma has no significance while filing the cards. An example is given below.

Example 2 :

813.5 Lee, Harper, 1926
LEE To kill a mocking bird.
To,k [London] Penguin Books [1963]

Area no 2: To classify specific literature, specific form, specific period, individual author, collected text with a common title

Example 3:

Sacrifice/ and other plays/ By/
Rabindranath Tagore/Indian edition/
Macmillan and Co. / 1963

891.4425 Tagore, Rabindranath,
TAG 1861-1941.
T 12
Sacrifice and other plays
[London] Macmillan, [1963]

The class number in the above example shows the usual first two divisions, i.e. i)DDC notation for Bengali drama, and the period number for Tagore, and ii) first three capital letters of the surname of the author. But the third part does not show the first three small letters of the title of the work, instead it shows the author number for Tagore derived from the Cutter - Sanborn three figure author table.

Adoption of this procedure clearly distinguishes the collected texts of the author from the individual texts without disturbing the order of the DDC notational system.

Area No 3 : To classify specific literature, specific form, specific period, individual author, collected text without a common title

Example 4 : Luigi Pirandello / Right you are!
(if you think so)/
All for the best / Henry IV/
Introduced and edited by/ E. Martin
Browne / Penguin Books [1962]

852.91 Pirandello, Luigi,
PIR 1867 - 1936.
P66 Right you are! (if you think so). Edited by E. Martin Browne [Longon] Penguin Books [1962]

The title page in the above example shows that there are three distinct books of Pirandello brought together artificially by the publisher and they do not have a common title. This is a case of artificial composite book. If there is a common title as in example 3, the common title could be retained in the main entry and author - title analytical entries could be made for other titles. But if the book lacks a common title as in the case of artificial composite books, the first title is retained in the main entry with a class number for a collected text and a special procedure of *also bound with* entries are prepared for other titles. For instance the above example needed three such *also bound with* entries.

i) 852.91 Pirandello, Luigi, 1867-1936.
PIR All for the best
All *Also bound with*
Pirandello, Luigi, 1867-1936.
Right you are! (If you think so)
852.91
PIR
P66

This entry signifies that the text All for the best is also bound with the text Right you are! (If you think so). The class number for the former is for a single text (i.e. giving first three small letters of the title), but for the latter, even if the main entry shows a single text the class number is for a collected text. This indicates that some other titles are included in this book. Similarly another entry is to be made for the text Henry IV, such as

ii) 852.91 Pirandello, Luigi, 1867-1936.
PIR Henry IV
Hen *Also bound with*
Pirandello, Luigi, 1867-1936
Right you are! (If you think so)
852.91
PIR
P 66

Now a third entry, which is an important one, and sometimes confusing at the beginning stage is the specific entry for the single text Right you are! (If you think so). The entry is given below.

iii) 852.91 Pirandello, Luigi, 1867-1936
PIR Right you are! (If you
Rig think so)
Also bound with
Pirandello, Luigi, 1867-1936
Right you are! (If you
think so)

852.91
PIR
P 66

This entry is done to indicate that Pirandello's Right you are! (If you think so), besides being present in the collection as a single text, is also bound with other books in the form of an artificial composite book. (The importance and special procedure of filling also bound with cards are dealt in sec. 12)

Area no 4 : To classify specific literature, specific form, specific period, individual author, collection along with the criticism by other authors

Example 5 : Fielding / Selections / with essays by / Hazlitt / Scott / Thackeray / with an introduction and notes by / Leonard Rice-Oxley/Oxford/ At the Clarendon Press / /1954/

823.5 Fielding, Henry, 1707-1754.
FIE Selections with essays by
F 45 Hazlitt, Scott /and/ Thakeray.
Oxford, Clarendon Press /1954/.

Here the critical appraisal part by other authors are ignored and the book is classified under Fielding as a collected text.

Area no 5 : To classify specific literature, specific form, specific period, individual author, biography or criticism on him by other authors

Example 6: William Riley Parker / Milton / A Biography / II / Commentary, notes / Index and / Finding-list / Oxford / At the Clarendon Press / 1968

821.094 Parker, William Riley
MIL Milton : A biography.
P 24 Oxford, Clarendon Press, 1968

As the book is specifically a biography or criticism of the author, a slight deviation in the notational plane has been made to separate single and collected works of the author from his/her critical or biographical works. The notation 09, which basically stands for history and critical appraisal in literature class has been introduced before the period number of the author whose biography or criticism are dealt in the book. In this case, the period number 4 for Milton (1608-1674) is used after the biography or criticism number 09. Adoption of this procedure In this case, the period number 4 for Milton (1608-1674) is used after the biography or criticism number 09. Adoption of this procedure not only separated single and collected works of an author from his/her critical works, but also brought the latter to the beginning while shelving them. The second part in the class number shows the first three capital letters of the biographee and the third part shows the Cutter's author table number for the biographer. Another example showing the critical appraisal on an author is given below.

Example 7: Joseph Conrad / J.I.M. Stewart / Longman / /London/ / /1968/

823.098 Steward, J I M
CON Joseph Conrad by J.
S 85 I.M. Steward /London/
Longman /1968/

The book deals with criticism of most of Conard's famous works and includes a chapter on his life (1857-1924) and literary career.

While dealing with works on critical appraisal another variation was found, that sometimes a specific title of an author has been commented or criticised by other authors, for example,

Example 8: Twentieth century interpretations / of / Wuthering Heights/ A collection of critical essays / Edited by Thomas A Vogler/Prentice-Hall , Inc / Englewood Cliffs, N.J. / 1968

891.623093 Vogler, Thomas A ed.
BRO Wuthering heights: A
V 88 collection of critical
essays. Edited by Thomas
A Vogler. Englewood
Cliffs, N.J., Prentice-
Hall /1968/

As the author of Wuthering Heights, the period of Emily Bronte (1818-1848) has been brought from Irish literature and used with the insertion of a 09 to indicate that the book is a critical appraisal of the text.

Area no 6 : To classify specific literature, specific form, specific period, more than one author, collected text with a common title

Example 9: Classic Irish drama / Introduced by W.A. Armstrong / The Countess Cathleen / W.B. Yeates / The Playboy of

the Western World / J.M. Synge /
Cook-a-doodly Dondy / Sean O' Casey /
Penguin Books / [1975]

891.622408 Classic Irish drama
C 61 London. Penguin Books
[1975]

The class number in the above example shows the addition of the notation for collection 08 after the period number. This has been adopted to separate collected texts of individual author under the same period. This means the collected texts of more than one author will be shelved after the collected texts of individual authors within the same period. As the book has a common title, author-title analyticals are prepared for other individual titles in the book.

Area no 7: To classify specific literature, specific form, specific period, more than one author, collected text without a common title

Example 10: The poems of / Gray and Collins /
Edited by / Austin Lane Poole /
London / Oxford University Press /
New York Toronto / [1961]

[Contents include poems of Thomas Gray, edited by Austin Lane Poole and Poems of William Collins, edited by Christopher Stone and Austin Lane Poole. Each book has its contents, preface, notes, appendices separately. That means two separate books have been bound together artificially].

821.608 Gray, Thomas, 1716-1771.
G 78 Poems, edited by Austin Lane
Poole, London, Oxford University
Press [1961]

As in the case of artificial composite books, the book is classified under the first author, i.e. Thomas Gray as a collected text and an *also bound with* entry is made for William Collins. The addition of 08 after the period number indicates that the book is a collected text of more than one author under the same period. The *also bound with* entries are given below.

i) 821.6 Collins, William, 1721-1759.
C 71 Poems
Also bound with
Gray, Thomas, 1716-1771.
Poems
821.608
G 78

ii) 821.6 Gray, Thomas, 1716-1771.
G 78 Poems
Also bound with
Gray, Thomas, 1716-1771
Poems
821.608
G 78

Area no 8: To classify specific literature, specific form, specific period, more than one author, critical appraisal

Example 11: The metaphysical mode / from Donne
to / Cowley / By / Earl Miner /
Princeton University Press /
Princeton, N.J. / 1969

821.409 Miner, Earl
M 66 Metaphysical mode from
Donne to Cowley. Princeton,
N.J., Princeton University
Press, 1969.

The notation for critical appraisal of 9 has been used here to indicate that the books is a critical appraisal on a particular period and its application after the period number indicates that the book deals with more than one author.

Area no 9: To classify specific literature, specific form, specific scope, specific period, more than one author, collected text

While classifying such books, the scope is ignored and the book is classified according to the procedure adopted for area no 6 and 7 depending upon its nature.

Area no 10: To classify specific literature, specific form, specific scope, specific period, more than one author, critical appraisal

While classifying such books, the scope is ignored and the book is classified according to the procedure adopted for area no 8.

Area no.11: To classify specific literature, specific form, specific scope, more than one period, critical appraisal

Such books are classified generally according to the provisions of DDC.

Area no.12: To classify specific literature, more than one form, specific period, individual author, collected text with a common title

Example 12: Collected / Poems and Plays / of / Rabindranath / Tagore / Macmillan / London. Melbourne. Toronoto / 1967

891.4415 Tagore, Rabindranath,
TAG 1861-1941.
T 12 Collected poems and plays
London, Macmillan, 1967.

The books is classified as a collected text under the known form (i.e. Poetry) of Tagore.

Area no 13: To classify specific literature, more than one form, specific period, individual author, collected text without a common title

Example 13: The Bodley Head / Ford Madox Ford / Volume I / The Good Soldier / Selected memories / Poems / The Bodley Head / London / /1962/

823.91 Ford, Ford Madox, 1873-1939.
FOR Good soldier. London, (The)
F 71 Bodley Head 1962

The book is classified as an artificial composite book. The other *also bound with* entries are given below.

i) 828.0991 Ford, Ford Madox, 1873-1939.
FOR Selected memories
F 71 *Also bound with*
Ford, Ford Madox, 1873-1939.
Good soldier

823.91
FOR
F 71

ii) 821.91 Ford, Ford Madox, 1873-1939.
FOR Poems
F 71 *Also bound with*
Ford, Ford Madox, 1873-1939.
Good soldier

823.91
FOR
F 71

iii) 823.91 Ford, Ford Madox, 1873-1939.
FOR Good soldier
Goo *Also bound with*
Ford, Ford Madox, 1873-1939.
Good soldier

823.91
FOR
F 71

The argument behind each entry is similar to that of area no. 3.

Area no 14: To classify specific literature, more than one form, specific period, individual author, collected text with critical appraisal by other authors.

Example 14: Milton / Poetry & Prose / With essays by Johnson / Hazlitt / Macaulay / With an introduction by A.M.D. Hughes / and notes by various scholars / Oxford / At the Clarendon Press / 1962

821.4 Milton, John, 1608 - 1674.
MIL Poetry and Prose with
M 66 essays by Johnson, Hazlitt
and Macaulay. Oxford,
Clarendon Press 1962

The book is classifiec under the known form (i.e. Poetry) of the author as a collected text ignoring the critical appraisal part of the book.

8. SEQUENCE OF CONCEPTS UNDER A SPECIFIC FORM

The foregoing solutions to different types of books helped to specify different concepts under one form in the following sequence :

i) more than one period, more than one author, collected texts,

ii) more than one period, more than one author, critical appraisal,

iii) specific period, individual author, critical appraisal about the author / work / biography,

iv) specific period, individual author, single text,

v) specific period, individual author, collected text,

vi) specific period, more than one author, collected text, and

vii) specific period, more than one author, critical appraisal.

9. FILING ORDER OF TOTAL CONCEPTS

The filing order of the total concepts within a particular literature is given below. American Literature has been cited as an example.

801 - 809	General literature
810	American literature, more than one form, more than one period

811	American poetry
811.008	American poetry, more than one period, collected text
811.009	American poetry, more than one period, critical appraisal
811.091-.095	American poetry, specific period, critical appraisal

Under each period:

- i) Three capital letters of the surname of the author criticised with the Cutter's author table number for the criticiser
- ii) Arrangement : Alphabetical

811.1-.5	American poetry, specific period, individual author, single and collected texts

Under each period in the following sequence :

- a) Single text
  - i) Three capital letters of the surname of the author with three small initial letters of the title
  - ii) Arrangement : alphabetical
- b) Collected text
  - i) Three capital letters of the surname of the author with Cutter's author table number for his surname
  - ii) Arrangement : Alphabetical

811.108-.508	American poetry, specific period, more than one author, collected text
811.109-.509	American poetry, specific period, more than one author, critical appraisal

10. DEMONSTRATION OF A PORTION OF SHELFLIST

811.008 098	Oxford Book of American verse Edited by F.O. Matthiessen
811.009 P 35	Pearce, Roy Harvey Continuity of American poetry
811.095 ELI G 35	George, A G T.S. Eliot : His mind and art
811.095 POU K 36	Kenner, Hugh The Pound era
811.4 WHI Lea	Whitman, Walt, 1819-1892 Leaves of grass
811.5 ELI Old	Eliot, Thomas Stearns, 1888-1965 Old possum's book of practical cats
811.5 ELI E 42	Eliot, Thomas Stearns, 1888-1965 Collected poems, 1909-1962
812.095 ELI J 77	Jones, David E The Plays of T.S. Eliot
812.5 ELI Coc	Eliot, Thomas Stearns, 1888-1965 Cocktail party
812.508 N 53	New American Drama A Collection of modern American dramas
812.509 K 31	Kernan, Alvin B ed. The modern American theatre: A collection of critical essays.

11. STATISTICAL OBSERVATIONS

11.1 Total books

Table 2 reveals the total number of books in the sample and the total number of books needed classification in different literature.

11.2. NUMBER OF DIGITS

An analysis of the number of digits of the class number of different literature is given in Table 3. The calculation of the number of digits has been made only for those areas where more than 25 books had to be classified from the sample.

Table 3 reveals that only seven areas in the sample had 25 or more books each which needed classification. The table shows two columns for each literature, one is for original (0) class numbers where the books did not need any revision, that means the notation of the original DDC scheme completely satisfied the concept specification in them; while in the

Table 2. Literature-wise total number of books in the sample.

Literature	Class number	Total books in the sample	Total books needed classification
General	800	130	79
American	810	516	421
English	820	1534	1125
German	830	82	54
French	840	129	107
Italian	850	18	18
Spanish	860	10	8
Latin	870	1	1
Greek	880	41	24
Sanskrit	891.2	54	21
Modern Indic Literature	891.4	1	1
Punjabi	891.42	4	4
Hindi	891.43	22	21
Bengali	891.44	29	15
Oriya	891.45	13	10
Marathi	891.46	2	2
Gujrati	891.47	1	1
Iranian	891.53	1	1
Irish Gaelic	891.62	101	74
Scottish Gaelic	891.63	37	27
Welsh	891.66	13	12
Russian	891.7	49	43
Slavic	891.8	3	3
Hebrew	892.4	2	2
Arabic	892.7	4	4
Oralic	894.5	9	8
Dravidian	894.8	6	6
Chinese	895	3	3
African	896	1	1
	Total	2816	2096

other (R) the books needed revised class numbers for complete concept specification. A calculation for the average number of digits per book in different literature irrespective of the total number of books in each digit group was made. The American literature showed 5.5 average digits in Original and 8.0 average digits in Revised books. Similarly, the average digit calculation per book for English literature (0 - 6. 0, R-8.0), German literature (0-7.0, R-9.5), French literature (0-5.0, R-9.6), Irish Gaelic (0-8.0, R-13.5), Scottish Gaelic (0-10.5, R-11.6) and Russian literature (0-7.0, R-10.6) was also made. The average number of digits for revised books in the different areas literature showed that their number was within the range of the physiology of eye and psychology of memory.

11.3 NUMBER OF BOOKS REVISED

Table 4 reveals the percentage of books revised from their total classified books in the sample. The percentage calculation has been made only to those areas of literatures which had 25 or more books requiring revised class numbers.

It can be noted from Table 4 that in those areas of literature considered, almost 90 books needed revised class numbers. This is a clear evidence of how many books needed concept specification in literature for their effective retrieval.

12. ALSO BOUND WITH ENTRIES

These are special entries adopted to solve the problem of artificial composite books. It has been seen that certain publishers bring out publications having i) two or more books of individual authors, ii) more than one author either of specific period or of more than one period, iii) in certain cases of more than one form and iv) of more than one literature, for commercial purposes. It was felt that in those cases specifying the particular concept of the book by classifying according to the traditional provisions of DDC was not possible. Therefore, this procedure was adopted to locate a particular book in the shelf as far as practicable, without distorting the notational order of DDC.

12.1 Filing of *also bound with* cards

The *also bound with* cards are filed according to their usual alphabetical sequence, but at places where a single text entry and an *also bound with* card of that text simultaneously

Table 3. Literaturewise distribution of digits, O=Original, R=Revised.

		Digits											
		3	4	5	6	7	8	9	10	11	12	13	Totals
American	O	-	18	3	12	6	-	-	-	-	-	-	39
	R	-	-	-	7	60	-	82	233	-	-	-	382
English	O	1	44	18	46	16	13	5	-	-	-	-	143
	R	-	-	8	26	86	52	161	192	457	-	-	982
German	O	-	-	-	2	-	2	-	-	-	-	-	4
	R	-	-	-	-	4	5	2	12	23	4	-	50
French	O	-	2	-	2	-	-	-	-	-	-	-	4
	R	-	-	-	-	6	10	7	28	43	-	9	103
Irish Gaelic	O	-	-	-	-	2	-	1	-	-	-	-	3
	R	-	-	-	-	-	-	1	14	-	34	22	71
Scottish Gaelic	O	-	-	-	-	-	-	1	-	-	1	-	2
	R	-	-	-	-	-	-	-	1	-	1	23	25
Russian	O	-	-	-	3	-	1	-	-	-	-	-	4
	R	-	-	-	-	-	-	6	-	5	28	-	39

Table 4. Percentage of revised books

Literature	No. of books classified	No.of books revised	Percentage
American	421	382	90.7
English	1125	977	86.8
German	54	50	92.6
French	107	103	96.3
Irish Gaelic	74	71	95.9
Scottish Gaelic	27	25	92.6
Russian	43	39	90.7

occur, they are filed in that order. For **example,**

813.3 Hawthorne, Nathaniel, 1804-1864.
HAW Scarlet letter. New York,
Sca The Modern Library, 1950

813.3 Hawthorne, Nathaniel, 1804-1864.
HAW Scarlet letter
Sca Also bound with
Hawthorne, Nathaniel, 1804-1864,
Scarlet letter

813.3
HAW
H 39

The above two cards show that Hawthorne's Scarlet letter, besides being present in the collection as a single text, it is also bound with another book, whose class number indicates that the book is a collected text. The latter card belongs to an artificial composite book. Both the cards are filed in the sequence given above.

12.2 Frequently Occurring Authors

An investigation of the authors whose names occurred most frequently in the *also bound with* cases in the sample was made. Table 5 gives the percentage of authors appeared in *also bound with* cases in their respective areas of literature with the forms in which they had occurred.

Table 5. Percentage is also bound with authors

Literature	Form	Total authors	Also bound with cases	Percentage
American	Drama,Fiction	103	9	8.7
English	Poetry,Drama, Fiction	257	9	3.6
Other	Drama,Fiction	69	12	17.39

It can be noted from Table 5 that not many authors occur in *also bound with* cases. Therefore, the addition of special *also bound with* cards would not hamper the natural order of the system. Moreover, adoption of this procedure was found to be quite helpful for locating books when they appeared as artificial composite books.

13. USER REACTIONS

The adoption of the new procedures was explained and demonstrated to the users of the Library and a cyclostyled pamphlet was distributed among them explaining its procedures and usefulness. The usual shelflist of the collection was kept as a control to the revised shelflist and the reactions of the users were recorded. The users' reactions were very much encouraging except in very few cases where it tended to be slightly confusing at the initial stages.

14. ADVANTAGES AND LIMITATIONS

Implementation of the new procedures in the day to day working of the library had certain advantages and limitations. They are enumerated below.

14.1 Advantages

i) Single texts of individual authors are quickly distinguished from the collection.

ii) books on critical appraisal could be kept separately by authorwise for research purposes.

iii) the problem of artificial composite books could be solved, bringing into light the single texts which otherwise got hidden in the collection.

14.2 Limitations

i) sometimes caused filing inconsistency

ii) books of critical appraisal on an individual author of a specific period got separated from those of more than one author of that period.

iii) the increase in the number of digits in a class number caused confusion to the users at the beginning.

15. CONCLUSION

A strong necessity for such changes in the literature class was felt during the working of the library, specially due to the demands of the research scholars working in the field. The implementation of the project solved a good number of problems in concept specification of books on literature keeping the Dewey notational order, as far as practicable, intact.

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UNIFORMITY IN BOOK SIZES: A NEED OF THE HOUR

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Non-conventional sized books (over and undersize) are common problem of all libraries. Several methods of shelving such publications have been applied but librarians are still finding it hard to cope with the increasing diversities in book sizes due to limitations of shelving capacity. Discusses publisher's role in the matter from librarian's point of view starting from the receipt of manuscript. Suggests possible ways and means for bringing about uniformity in book sizes and stresses the need for creating cordial relations between librarians and publishers.

INTRODUCTION

The expected outcome of the work of scholars and researchers is normally some form of publication. Ideas, findings, data, opinions are embodied graphically within the physical forms of journal articles, conference papers, monographs, reports, books, computer print-outs, video-display units, etc. in order to pass them to the realms of public and scholarly discourse.

The act of publication is an attempt to present the literature to the largely unknown audience for information and assessment overcoming the barriers of time and space.

The publisher is responsible for giving the physical form to the author's ideas in order to make them worthy of perusal. In diverse physical forms, the publications are acquired, processed and shelved by the libraries and information centres, to make them available to its patrons. Non-conventional size books (over and undersize) are a common problem of all libraries, no matter how big or small it is, since these publications require special consideration in their processing, shelving and maintenance. Several methods of shelving are in practice to accommodate such publications. Libraries are finding it hard to cope with the increasing diversities in book sizes due to their limitations of shelving capacity.

Much has been talked about in books and journals on various aspects of book-publishing but little emphasis has been given for bringing uniformity in book sizes. The basic idea of the discussion is to review the existing diversities, particularly non-conventional sizes. The discussion excludes some of the publications like atlases, encyclopaedias, dictionaries, directories and yearbooks where unusual size cannot be avoided due to the nature of the material.

The study narrates the publisher's role from librarian's point of view, starting from the receipt of the manuscript. It also suggests the possible means and ways for bringing about uniformity in book sizes. It further suggests the need for creating cordial relationship between the publisher and the librarian.

The study coupled with appropriate examples and figures provides a clear picture to the professionals in understanding the reasons of these variations and their possible solutions.

BOOK SIZES

In any library, it is hard to find two books identical in height or width, even volumes of a single set are sometimes different in sizes. On the basis of the sizes, the books have been named as Narrow - if the width is less than 3/5 of the height; Square - if the width is more than 3/4 of the height; and Oblong or Landscape - if the width is greater than the height.

The books have also been grouped on the basis of the trim-sizes (outside dimensions of the paper page after the book has been trimmed.

Measurements are given in inches with the width being given first).as seen in certain trade books e.g.

5 3/8 x 8" - Fiction and non-fiction of minor importance
5 1/2 x 8 1/4" - Non-fictions
6 1/8 x 9 1/4" - Non-fiction of major importance and the college texts
8 1/2 x 11" - Pictorial books
4 1/2 x 7" - Paper backs

Folio, quarto, octavo are also used as indications of approximate size of the books.

BOOK SIZES AND THE PRINTING PAPER

According to Marshall Lee, "The paper merchant keeps hundred of items in stock - different brands, kinds, qualities, finishes, colors, weight and sizes. Obviously, he wants to reduce this number to the fewest possible. The printer has presses of various sizes, but the number is limited. Presuming the publishers want to utilize the full size of the presses, they need mainly the paper sizes that fit the presses available. Consequently paper is made in a few standard sizes and any other must be made to order. Each paper mill has its own minimum quantity requirements for making special sizes in each grade of paper".

Further according to Marshall Lee, "the page size of the book is generally an arbitrary decision based primarily on custom. Economy affects the decision, but in most cases custom has been shaped by economy, so there is little conflict. Once a press size has been standardized to accommodate a preferred trimsize, paper is made to fit that size."

Foregoing paragraphs illustrate that there is no definite policy to decide the book sizes. With the result diversities of a high magnitude has become a part of this trade. Whatever trimsize is desired by the publisher, the book is made accordingly without considering much about the actual consumers.

BOOK SIZES AND ANGLO-AMERICAN CATALOGUING RULE

AACR rule 2.5 D has been framed to describe the diversities in book sizes and as per this rule, the height of the publication is to be given in centimeters exact to within one centimeter. Books 10 centimeters or less in height are to be described in milimeters. In case of bound volumes the height of the binding is to be given, while for a pamphlet inserted in the binder, the height of the pamphlet is given.

Width of the publication is to be given if it is less than half the height or if it is greater than the height, the height is to be given first.

If there is a difference of less than 2 centimeters in the size of the volumes of a set, the larger size is to be given. If the difference is more than 2 centimeters, the inclusive sizes are to be given, while a set with single variation in size, the prevailing size is given followed by the variation.

The rule provides a coverage to the existing variations and giving an idea to the reader about the size of the publication followed by the location mark in the catalog entry, if the publication is of unconventional size. This does not provide solutions to the library personnel in processing and accommodating these publications.

UNCONVENTIONAL SIZES

In every library there are materials other than the normal run. In technical or research libraries they form a high proportion of the stock. It has been well established that about 10% of the entire collection is of unconventional size. The percentage seems to be small but the library personnel have much inconvenience in their processing, shelving maintenance and making them available to the readers.

Table in the next page provides a comparative study of few cases to show the unconventional sizes (over and under size) against preferred trim-size of 6x9", besides specifying the book length in context to the book size and vice-versa.

Examples 3, 9 and 10 in the Table show that the books have over height with book length running to few pages, contrary to this is seen in examples 1 and 6. These examples clearly indicate the monopolistic approaches of the publishers and confirm that the size of the book is on the mercy of the publisher. Whatever paper size is desired or available on hand, the book is designed accordingly without considering much about the pre and post publication form of it.

Figure-I explains how different book sizes are accommodated on the shelf. The book-1 (H1 x W1) is of normal size and can be accommodated within the shelf. The book-2 (H2 x W2), where the book height is more than the shelf height (examples-2,3,4,5 in the Table). The book is to be kept on its fore-edges, the height becoming the width projected out of the shelf as is true for book-3

TABLE

Comparative Sizes and Lengths of the Unconventional Books

Sl. No.	Particulars of the books	Pages (Book length)	Size* (Height x Width)
1.	Westwick, C A: How to use management ratios. Epping, Ess., Gover, 1973	xv, 288p	8.8 x 12
2.	Hill, Malcolm R: Export marketing of capital goods to the socialist countries of the Eastern Europe Farnborough, Wilton, 1978.	xiii, 213p	11.8 x 8
3.	Bettleheim, Charles: Some basic planning problems. New York, Asia Publishing, 1960.	vii, 68p	11.5 x 8.8
4.	Meddis, Ray: Statistical handbooks for non-statisticians. London, McGraw-Hill; 1975.	viii, 152p	10.13 x 8.1
5.	Martino, R L: Resource management. Wayne, Penn., MDI Publications, 1968.	147p	11.4 x 8.11
6.	Learning Systems Ltd.,: The interpretation and construction of break-even charts. Oxford, Pergamon, 1967	131p	5.14 x 8.4
7.	Moss, John: Introduction to data processing. London, Input Two Nine, 1978.	113p	11.10 x 8.4
8.	Rumaihi, M G: Bahrain; social and political change since the first world war. New York, Bowker, 1976.	xiv, 258p	11.12 x 8.11
9.	Sykes, Alan: The lease buy decision; a survey of current patches in 202 companies. London, British Institute of Management, 1976.	40p	11.13 x 8.4
10.	National Safety Council: Making safety at work. New York, McGraw-Hill, 1976.	72p	11.1 x 8.8

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* Measurements are shown in inches exact to the height and width of the books. (This is contrary to AACR, but are given to illustrate the exact situation).

(H3 x W3) and 5 (H5 x W5), where the width is more than the shelf depth (example-1 in the Table). The book-4 (H4 x W4) is undersize and appears buried within large size books.

The above cases are common to most of the libraries. They provide a clear picture to the problem and emphasises the need for uniformity.

DISADVANTAGES OF UNCONVENTIONAL SIZES

Unconventional size publications require special treatments in their processing, shelving and maintenance. These treatments are usually inconvenient and time consuming in addition to the following disadvantages for the library personnel and the readers.

1. Avoiding Single Sequence

Basic idea of the library is to provide easy access to the material available by arranging it in the most convenient manner. Increasing diversities in book sizes are hampering the libraries in accommodating the entire collection in a simple manner. Libraries are adopting different methods to solve the growing problem of shelving of the unconventional sizes.

Some libraries plan separate sequence on the basis of sizes as practiced by some

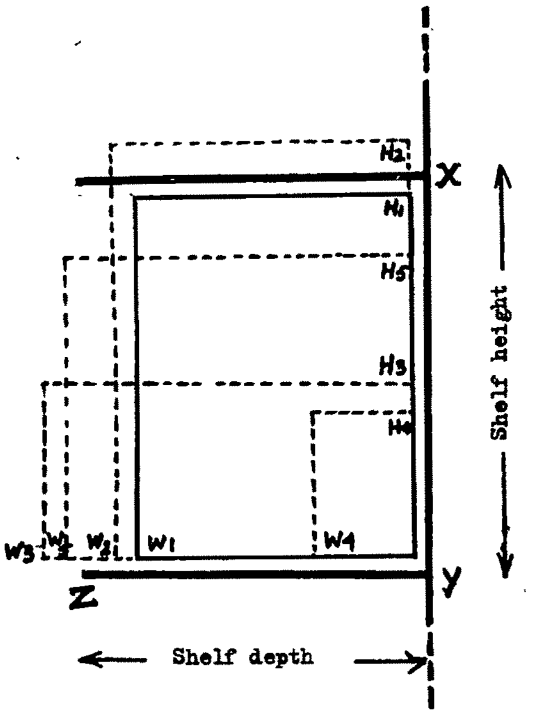

FIG.I : Side view of the book shelf to illustrate the diversities in height (H) and width (W) of the books

1. H1 x W1 .. Book normal height and normal width
2. H2 x W2 .. Book overheight with normal width
3. H3 x W3 .. Book underheight with overwidth
4. H4 x W4 .. Book underheight with underwidth
5. H5 x W5 .. Book normal height with over width.

- Solid lines showing the height and depth of of the shelf.
- Dashed lines after X and Z points shows unconventional height and width of the books.

depository libraries, while others put location marks for such publications e.g. 'Q' for books above 9 inches and 'F' for the largest.

These alternatives reduces the use of these publications due to their location away from the main subject collection. Looking into various sequences, even if location mark is provided is inconvenient and rather time consuming in an open access library.

2 Reduction of Shelving Space

The overall effect of unconventional sizes is on the shelving capacity of an individual library. Oversized books shelved with normal books result in occupying more space, since they are accommodated by keeping them on their fore-edges or horizontally, thus occupying more space than their actual sizes. These books project out beyond the shelf depth making access difficult and reducing the between-stack area.

With regard to undersize books, they are usually lost in between other larger books or even sometimes they are pushed behind them, misleading the reader about their availability in the library. In order to overcome this problem, some libraries keep them in book boxes along with other books, which again leads to occupying more space.

To accommodate the oversized publications with the remaining stock, modifications have to be made in the height of shelves. Bottom shelves or sometimes the uppermost shelves are left for such publications by adjusting the tiers at different heights. Distance at which shelves are fixed is of course mainly of interest in that it affects the number of shelves that can be fitted per tier and the overall shelving capacity of the library.

3 Limitations of Shelving System

Every library is equipped with specific type of shelves. Flexibility in the housing capacity of the shelves is a matter of concern for all the libraries.

Libraries having fixed shelves, wall mounted shelves, closed back shelves or pannel shelves face extra problem in accommodating unconventional size books, since no flexibility in the structure is possible.

Experience shows that once a library starts with certain shelving system, it finds it hard to change over to some other system due to their limitations, more particularly the funds available for such expenditures. Libraries are left with no option but to compromise with the existing system until there is some possibility for a change.

4 Physical Damage to the Books

Unfavourable storage of the books tend to cause physical damage to books. The books of unconventional sizes are usually kept on their fore-edges or horizontally or even sometimes on the upper edges of other books of a particular shelf. This not only gives a poor look to the shelves but causes wear and tear to the books, thereby reducing the average span of these books.

SUGGESTIONS

In order to overcome the growing diversities in book sizes, the following points are suggested :

1 Need for Cooperation between Librarians and Publishers

Cooperation prevails in all walks of life. It enables us to work as team and to reap the maximum benefits of our efforts. The same may be applied to the book publishing. Publishers must realise that neither library development nor book publishing development can proceed very far without full cooperation from the other. To help their own future the publishers should do everything they can to aid the development of libraries, in addition to helping the educational and economic advances of their countries.

The library planners, manufacturers of the library furniture, equipment are going shoulder to shoulder with the librarians, in finding out the possible means and ways which are most suitable to the libraries. The outcome of their cooperation is providing economy in expenses as well as in space. Various devices for shelving, including that of compact shelving, are the result of their cooperation.

It is rather surprising to see that there exist no definite relation, except that of trade, between the publishers and the librarians - the major consumers of the books. (R.E. Barker in a report submitted to UNESCO in 1956 stated that half of the global book production goes to the libraries). There is vital need for close cooperation between them, more particularly at pre-publication stage of an individual book. In consultation with each other certain norms are to be laid down for bringing out the uniformity.

Cooperation between publishers, keeping aside the competetive urge, may play a part in reducing the diversities in book sizes. Professional organisations, associations of national and international importance may play a vital role by cooperating on this aspect.

There is a growing need for holding seminars, conferences in order to provide the opportunities for the librarians and publishers to exchange their views and to develop the understanding about each other's problems and limitations in the best possible way. It will further help in eliminating diversities, reducing competition followed by economy in prices.

The cooperation will help in getting the publications of uniform sizes, thus simplifying the processing and maintenance of all the publications in a uniform way. (Fig.II).

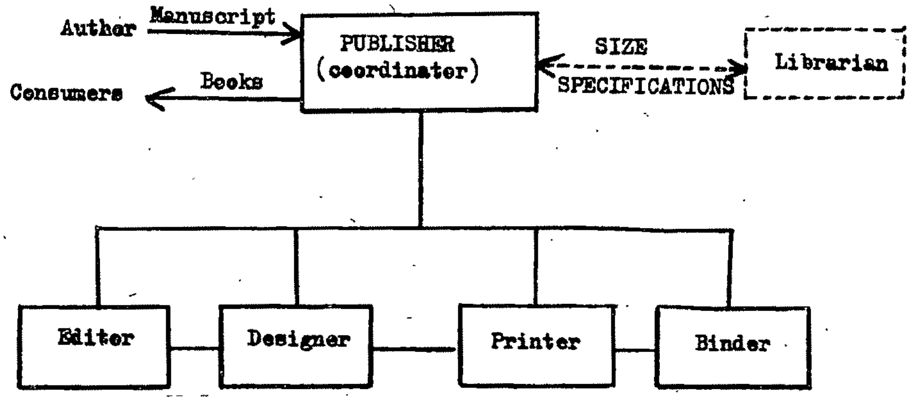

FIG.II : Book production cycle. Dashed line showing the need for new link between librarian and publisher to specify the physical size of the book.

2 Possible Role of the Publishers

Publishing is a business and the object of a business is to reap the profit, however,the publisher must realise that it is only the profit motive that book publishing resembles any other business, otherwise it is much more informal, complicated and hazardous than most. It differs from other manufacturing business, since it produces a hundred entirely different products in one year, each one a unique creation by an independent individual who has determined personally what the product shall be. There is no way of knowing how many buyers will be there for it.

Physical manufacture of the book is not the part of the publishing functions and most publishers today employ outside designers, printers and binders to perform these operations, but as a coordinator of the entire book production process, it is obligatory on the part of the publisher to supervise and control the reproduction of the work. He has the responsibility of designing the layout, title page, dust jacket and binding. He chooses the style and size of type, selects the paper and specifies the method of composition and presswork to be used.

It is the designing stage which seems to be crucial in determining the physical form of the book and a check at this stage will result in getting fruitful result. In the production schedule while specifying the trim-size by the publisher, decision should not be based on the paper size available in the stock at a given time, but it should be decided in the light of the manuscript and its actual destination i.e.library. While designing the book,they should not overlook the average height and depth ratios of the shelves.

The publishers must try to prevent the books being trapped in the commercial and industrial system. They should further realise that the introduction of wide varieties in this trade for the sake of aesthetic urge seems to be of little value, since the fate of a product is decided on the utility of the contents. Diversity is playing only the role of increasing competition followed by economic stress on the consumers.

3 Standardization

Standardization of human activities, operations, tools, forms, records and materials is a fundamental pre-requisite to scientific management. Standardization has been the foundation for the before-mentioned controls. It has made possible much of the technological progress of the 20th century.

The objective of standardization is to eliminate useless, wasteful and disadvantageous diversity. It brings more regularity, reliability and facilitates interchangeability.

Librarians have long been cognizant of its importance and the standardization of library equipment, materials and methods has gained wider acceptance.

Partial attempts have also been made in book publishing trade by fixing certain trim sizes for books, but the picture is still far from bright. Some kind of uniformity is being observed quite rigidly in trade paper backs where price is the primary element to satisfy the retailers.

In the middle of the 20th century printers attempted to bring uniformity in book sizes by keeping certain presses set for one size of sheet, plates and margins. Partial standardization by the manufacturers of the presses have also been attempted to fit the most popular trim sizes.

Standards for page size have been issued by British Standards Institution (BS: 1413:1970) and International Organization for Standardization (ISO: R216) but the study reveals that the advances in this direction have been painfully slow, due to competetive practices followed by the publishers.

Standardization in paper size will bring a direct control to the problem. Extensive efforts by the paper manufacturers at national and international level are needed to develop a cordial atmosphere on this aspect. Introduction of standard "Library Size" printing paper for books in the light of average shelf height and depth will be the most appropriate action in this direction.

Once "Library Size" paper is introduced in book publishing, it will not be very far to see its impact upon uniformity.

IMPACT OF STANDARDIZATION

It will be in two ways -

1. On book-publishing trade
   - Uniformity in paper sizes.
   - Simplifying the paper stocking,

- estimating and costing.
- Simplifying the handling and packaging.
- Uniformity in press sizes.
- Simplifying the designer's job.
- Simplifyin the collation.
- Economising the production cost (smaller the page size lesser the cost of paper and printing)
- Reducing the competetion among publishers
- Reducing the unwanted varieties.
- Simplifying the binder's job.

2. On libraries

- Simplification in processing, shelving and maintenance.
- Economising the buying cost.
- Possibility for accomodating all books in single sequence.
- Proving easy access to the readers.
- Maximising the shelving capacity.
- Eleminating the limitations of shelving system, whether fixed, adjustable, pannel or any other.

CONCLUSION

It is hoped that the above discussion will bring some fruitful result in this direction If due consideration is given by the publishing team, some kind of uniformity will be seem. Further, it is hoped that the publishers will do their best by avoiding the production of unconventional size books to help the libraries on one hand and the readers on the other hand.

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A NOTE ON THE IDEA GENE AND ITS RELEVANCE TO INFORMATION SCIENCE

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An attempt has been made to draw attention to the process of growth of knowledge being similar to the process of biological evolution as featured by neo-Darwinism. The idea of memes or idea genes as proposed by Richard Dawkins has been reported and its possible relevance and application to information science, especially for propounding a general theory of information growth, indexing and classification have been considered. Need to shift the focus of interest from the documents or units of literature to the concepts has been stressed.

INTRODUCTION

Information science together with librarianship is essentially a Social Technology* Its scientific base is to be built up on theoritical structures and possibilities of experimental verifications. As normally the cases with social sciences or technologies, controlled experiments, even uncontrolled and repeated observations are very difficult for the reason that we neither know the essential parameters and their functionals nor in most case we have definite methods of their quantitative measurements. One complicated way may be to relate certain social parameters to biological or to physical ones which are already well defined and whose behaviours and equations are known. Another, more direct method should be to define and discover such notions which may serve some of our theoretical purposes.

In Physics, we find that a physicist defines and discovers certain parameters (observable or measurable) and establishes their relations with one other and then finds out which of them change or remain unchanged when some of the factors get changed in a certain defined manner. In Classical Physics, some of such parameters are the total quantity of matter (mass) or energy or linear or angular momenta of a system as a whole. In Relativity Physics, the electric charge and the velocity of light remain the same during transformation frome one coordinate system to another moving with a uniform velocity relative to the former.

In Biology the genes are considered, in a way, to play such a central role for evolution. Recently, Richard Dawkins(1) has forwarded a similar idea which I think may be effectively used in informatics.

IDEA OF IDEA GENES

Dawkins observes that ideas flow culturally in time and space (flow through space involves time, even if small). He says that ideas have their basic units, and these units, like the units of heredity, 'the genes', are carriers of cultural inheritence.

As genes are biologically transmitted, and biological evolution proceeds through gene invariance and gene mutation, so are these idea genes transmitted culturally being invariant mostly and mutating gradually. He calls these 'idea genes' as 'memes'

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*By a technology we mean a field of activity which has three aspects: (i) a service goal, (ii) theoretical or philosophical basis and (iii) tools or mechanization. Those technologies which are derived directly from the contexts of physical sciences, for example, automobile engineering or electronics may be called physical technologies. Medical science, agriculture or veterinary science are biotechnologies. So, such professions or fields as education, journalism, social work, library and information science, etc. may be categorised as social technologies.

We, for our purpose should replace 'idea' by 'information'. I do not know how far Dawkins' 'memes' have been discussed and accepted by the sociologists and sociobiologists so far. I am also ignorant of what roles can it play in these fields. But I am hopeful that here we get something of real value to give informatics a better theoretical base.

Dawkins' definition of gene as a unit of convenience, i.e., a length of chromosome with just sufficient copying fidelity to serve as a viable unit of natural selection is worth noting and its analogy pays well in case of 'meme' except that memes have nothing compatible to chromosomes or to alleles. The gene replicators have their high survival value in the qualities of longevity, fecundity and copying fidelity. Survival value of the meme has slightly different characteristics. The longevity of any one copy of meme is probably relatively unimportant as it is for any one copy of a gene. Fecundity is much more important than longevity of particular copies. If the meme is a scientific idea, its spread will depend on how much acceptable it is to population of individual scientists; a rough measure of its survival value could be obtained by counting the number of times it is referred to in successive years in scientific journals (Dawkins seems to be unaware of informatist's use of half-life and citation chain of a particular paper).

Dawkins expresses himself in somewhat uncertain manner in calling memes high fidelity replicators. However, consideration of genetic inheritence of many micro-minor characteristics, gives rise to an apparent doubt as to the working of indivisible and unblendable genes. Probably unknowingly, he gives us the clue when he writes - 'every time a scientist hears an idea and passes it on to somebody he is likely to change it somewhat.' Yet we know that every one gets the specific original idea as it should be. Stray and gross mutants are likely to die, only those ideas survive which are to be naturally selected or (should we say) fitted to the general environment of the scientific community and thought. The ideas (memes) of special theory of relativity can be taken as examples. Despite numerous mutants and alternatives, basic ideas of 1905 still survive.

With the characteristics of 'longevity' i.e., being propagated invariantly, 'fecundity' i.e., generation of offsprings and 'copying fidelity' i.e. guaranteeing the repetition of the self on the progeny, evolution progresses whereas the species survive. Biologically it occurs in the level of genes, not at the level of beings. What is implied in fecundity is dispersion which becomes a prominent characteristic at the cultural level. We should use the word dispersion in place of fecundity while dealing with memes.

Dawkins has used the word 'meme-complex' in similarity with gene-complex to avoid ambiguity in interpretation of the invariant continuity of the conceptual properties. Like co-adapted gene complexes in the gene pool there may also arise co-adapted meme-complexes, stable set of mutually assisting memes.

What about the nature of competition of meme pools? In Dawkins words-'......in general, memes resemble the early replicating molecules floating chaotically free in the primeval soup, rather than modern genes in their nearly paired chromosomal regiments'.

It may be a point to wonder, whether Dawkins had in his subconscious mind a prophetic consideration that as civilization or culture would continue in its path of culturally controlled natural selection, in a future state of stabilization, memes would also evolve themselves into an agency of nearly conjugated regiments of idea structures. We should not talk of pairing, nor of sperms and eggs from two parents (or generators), but we may think of contributions from different cultural blocks or idea generators to the generation of offsprings.

To show how Dawkins has touched upon the concerns of information science, I quote him further "Any user of digital computer knows how precious computer time and memory storage space are....the computers in which memes live are human brains. Time is possibly a more limiting factor than storage space and it is the subject of heavy competition. The human brain and the body which it controls cannot do more than one or a few things at once."

"If a meme is to dominate the attention of a human brain, it must do so at the expense of rival memes. Other commodities for which memes compete are radio and television time, billboard spaces, newspaper column inches and library shelf-space".

POPPER'S THEORY OF KNOWLEDGE AND MEMES

Dawkins' thesis has close and inherent relationship with Karl Popper's theory of growth of knowledge(2). It does not appear, however, from Dawkins whether he was aware of Popper's positions. Popper has clearly suggested that objective knowledge grows through a sort of evolutionary process where a natural selection comes into play through trials and error eliminations. He opines that a profound similarity exists between Darwinian evolution and growth of knowledge since Darwinism can be interpreted as a metaphysics and both fall in the category of what he calls situational logic.

According to him, the progress of scientific knowledge (or any sort of objective cumulative knowledge) occurs through the following steps - i) existence of a problem, ii) proposing a tentative theory, iii) error elimination by trial, iv) further generation of problems and repetition of the whole chain. Schematically it can be represented as-

PP1-TT1-EE1-PP2

This may be viewed as reinterpretation of the dialectical triad (thesis, antethesis, synthesis) in interpreting history of science and growth of scientific knowledge. This however, pertains in a way to social accumulation of knowledge and information in any form. It is now apparent that there is a possibility of considering growth of both living beings or biological objects and information or knowledge in terms of the mechanisms of Neo-Darwinian evolution. This leads us to one of the important theses of this paper.

Taxonomy, for a long time, has been a crucial problem of Biological Sciences. The first break-through was made by Linneaus by introducing the technique of binomial nomenclature. The formal approach to biological classification has been by the description of morphologic characters. The present-day classification chiefly depends on evolutionary dispersions and classes are designated by their genetic behaviours. The picture is, however, incomplete and the problem awaits solution. Attempts are already on print of using statistical methods, of employing computers and of replacing binomial nomenclatures by numericals.

In my view proper biological taxonomy would depend on the depiction of the evolutionary tree and establishment of proper linkages of morphometric, morphologic and anatomic features with behavioural traits through gene structures and gene pools. Notwithstanding tremendous advancement during the last two decades, we have to wait for some more time to have anything useful. Numerisation in biological classification seems to be an eventuality.

In the mean time, when we realise that the evolution of life forms and growth of information may be analogously treated-one through population genetics, natural selection, copying fidelity, mutations etc. and the other through information memetics, natural acceptance by tests and error eliminations and socio-ecological pressure, stable passages of ideas of modification in mobilities, we feel the need of making comparative studies of the two in sufficient depth.

The point is important. If biological taxonomic classification may be devised on the basis of evolutionary relatedness of species, though much more difficult, the same should be possible for knowledge classification also. Biological classification is yet incomplete in the sense that we are unable to construct the complete genetic map. A classification based on memetics, if possible, would be the only natural one for classification of knowledge or subjects.

It may also be of interest to note that Derek de Solla Price(3) brings forth the analogy of production of offsprings while discussing generation of research papers. It is well known that a new work depends usually on other men's work. Olden ideas, information, concepts are carried over and some new are added or some older ones modified on the basis of a researcher's investigations and interpretations. It is also obvious that influence of papers are nothing but influence of ideas and concepts contained in them.

Till now all our efforts for evaluation and quantitative measurements of growth and diffusion of knowledge were based upon published papers or documents as a whole. The approach is advantageous but not true to the situation. It is time that we get to a deeper level and try to build up our models of evaluation and measurements on concepts of memes.

MEMES IN INDEXING AND CLASSIFICATION

Already, any serious student of bibliothetic classification can feel that the traditional approach of starting with the universe of knowledge and then breaking it up (whether through a faceted scheme or not) is a closed one. It is now apparent that the ladder should be turned upside down. One should start with unitary classes or elementary or atomic concepts or terms and then synthesise them (CRG's programme)(4) Such attempts have failed so far. I think there are two vital reasons why such schemes may fail. One is the lack of a suitable technical innovation. The other is more vital- as soon as such a scheme is developed it would become backdated due to the fact that semantie connotations of the terms and elementary symbols and their interrelations would undergo evolutionary changes, and the whole coordinated string of concepts would become frustating. This second problem can possibly be overcome by constructing a memetic map.

The area of Information Retrieval in which the concept of meme may be applied most effectively is classification and indexing. Our foregoing discussion shows that devising a palpable scheme of classification based on memetics would require extensive research and solution of too many practical problems. In fact, it would necessitate at the outset developing a workable memetics itself. On the other hand subject indexes can be more easily constructed out of meme-complexes. The programme would be to select or find out suitable memes from an article (or document), put them together in a prescribed (natural) manner to produce a string. Such a string would produce a concept-index rather than a usual term-index.

As we all know, concepts and terms do not play the same role. Concepts are normally expressed through terms and are nondetachable in verbal communications (even in any sorts of symbolised communication, as any symbolic expression connoting some concept would virtually play the role of a term). But a term or an aggregate of terms in itself does not convey any information, a concept does.

MEMES AND BIBLIOMETRIC STUDIES

Obsolescence of scientific papers, even documents like books has been extensively discussed in literature. Obsolescence of a document is measured by the statistical counts of its being referred or used. The notion is not a very good one as such. Citation counts do not reflect whether the ideas contained in a paper are rejected or accepted or partly utilized. Whenever an idea is universally accepted or becomes embodied in the current thought its generating papers are not cited at all. Whereas a paper whose ideas have been rejected after some debate may also show the same sort of obsolescence on citation counts. In such measures of obsolescence we are ignorant of the life of an idea.

On the other hand if we could identify the memes and base our measures on whether these memes are being dispersed or being degenerated. Such measures would give us very specific insights. Not only this approach may help us in anticipating subject growths or declines, we may be able to predict future research trends and even changes in Scientific Periodical titles (or break up of periodicals) after studying the memes of the articles contained in a periodical for certain length of period.

The consideration of half-life counts should also be looked into from a different standpoint. Reference to a certain article is surely to grow and die but this does not reflect the actual situation with the value of the idea content of a paper. After a certain time the ideas expressed by the original paper may be so embodied to the current thoughts that only the name of the author may be noted in the text and no citation in the footnote or at the end may be needed. We should be very clear at this point. What is important: the life or half-life of the paper itself or the new idea content of the paper? Both have some purposes to serve. Usually a user wants the document so the usefulness judged from the half-life counts may help the information centre manager to plan his stores- when to pull out a journal from open stack and send to the back store. This, however, happens because of the fact that the older documents become more and more difficult to locate and knowledge of their whereabouts becomes scanty- which happens due to the fact that the document is not referred to. Yet the idea contents may well be discussed without referring to the original documents and the inquisitive reader has to be satisfied either by the secondary materials or by getting hold of the originals after some literature searching. If we are able to build up our models of meme structures and meme chains, we shall be in a position to do research into the relation of meme flows and article half-lives.

MATHEMATICAL APPROACH

Here we attempt to hint at a general outline of a possible approach which we intend to develop in a mathematical model in future communications.

Suppose we identify a meme at a time t_0 in a single document or in a number of documents n_0, we then go on finding the number of documents n_1, n_2, n_3 etc. for retention and n'_1, n'_2, n'_3 etc for mutants m_{01}, m_{02}, m_{03} etc at epochs t_1, t_2, t_3 etc.

So n_i and n'_i would give the population of offsprings. It may so happen that an idea gets lost after a certain period t_x. In that case from t_x to t there may not be any document with the idea. It is to be noted that we are not considering the research papers only but are talking of the documents or information carriers in general.

Suppose after an epoch there is no document with m_0, but a mutant m_{0p} originating at an epoch $t_1 - p' = tp$ gets hold of the documents after t_1. Now after a period t_m (say) it becomes universal i.e. any relevant document at all levels (be it a research paper, review article, textbook, school magazine or popular medium) corroborates the idea without referring to any other information source specially. We then consider it to have gained a stable status. We believed that in this manner we shall be able to establish a "population memetics" quantitatively. How such a thing may be useful to information science is a separate consideration. This however may be hinted. 'Memetics" may help us build a general theory of information growth, diffusion of ideas, half-lives and delay modes of theories and concepts. In our future researches we shall establish the models of propagation of memes with examples.

SOME PERSONAL OBSERVATIONS

Librarians or information scientists have recently been much more concerned and interested with the nature and growth of knowledge and information. This awareness is an obvious and direct response to practical problems. The information world has been equipped with certain technicalities and are held responsible for proper exploitations of them for serving the mankind already in a state of explosive informational awe. Kemp's book (5) is an attempt on the part of a librarian to review the situation and find out what relevance these ideas can have to future developments of information science.

Kemp has referred to Popper, Ziman and many others. But he has missed the importance of considering growth of knowledge as Neo-Drawinistic evolutionary process through stabilization and modification of ideas and its relevance in effective control of information.

That Kemp was not aware of Dawkins is obvious as both books appeared in 1976. I was fortunate to read both of them in 1978-79 and the epidemic theory of growth of knowledge of Goffman(6) and certain other models just before that. Earlier in 1976-77 I began doubting the exponential growth of knowledge or information as a whole, though I did not doubt this for physical documents in terms of number of publications (but not in terms of current literature at any epoch). I made some preliminary considerations and simple calculations which led me to believe that for the rate of growth of all information I, relevent to a community, the growth equation should be

$$\left(\frac{dI}{dt}\right)_c = K \log I \text{ or in other words,}$$

$$dI\,\frac{d^2I}{dt^2} + \beta\,\frac{dI}{dt} = 0$$

$(d, \beta, K$ are arbitrary constants)

Whether such a conjecture is true or false needs to be considered in another research programme. But there is sufficient ground to opt for such a weak growth rate when we consider 'meme' theory or natural selection of knowledge (or information) more seriously.

Memetics would not allow exponential growth as it has not been observed to occur for the totality of all biological species at any epoch, though exponential growth may take place in a certain epoch in a certain species or in a community as well as sharp exponential fall in crash declines similar to epidemics. It may be pointed out that all our models of information growth have depended upon the measure of (or rather counting of) the number of publications (and not to generations of idea packets) and that too, limited to a small field of knowledge. They would easily show the exponential growth or crash or logistic type growth (if observed for sufficient length of time) or any other type as are similarly revealed when a particular biological species or a community is studied.

As a passing remark I would like to add that classificatory problems, problems of symbolic representations and problems of characterisation of an evolutionary growth tree have been encountered in branches of knowledge other than biology. An early example is of classification of chemical compounds and elements and another very recent example is of elementary particles. About a decade ago I thought that elementary-particle classification may have a bearing upon documents vis-a-vis knowledge classification. Elementary particle features are multidimentional and they are characterised by quantum numbers. Document or subject features are also multidimensional. Through interaction features both of them give rise to various states and phases. In essence, I found afterwards that I was considering all the time something akin to integrative levels and aggregative levels. What I thought is that we should search for discovering some features or tags which may be used in the fashion of "quantum numbers" thus enabling subject classification comprehensible.

I did not pursue the research. But it is likely that as information itself plays an important role through natural coding, signals, decoding, triggering off of feed back or forward reaction mechanism, whether in elementary particle world or in gene pools or in human communication and growth of knowledge, certain fundamental rules are obeyed in these games at different levels. May be we will never discover these rules or the rule, and there is a possibility that no such rule exists at all. However, whether such a rule exists or is discoverable is no matter for us. For control of information and its satisfactory storing, retrieval and use, we need to know many of its qualities and modes of growth and dispersal. To achieve this objective comparative studies with many other fields may be of tremendous help, which may again help solving problems in those provinces.

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AN ASSESSMENT OF REPROGRAPHIC RESOURCES IN INDIAN AGRICULTURAL UNIVERSITY LIBRARIES

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Describes the importance of reprography in modern libraries and documentation centres. Gives an account of reprographic services of 12 Indian agricultural university libraries. An account of equipment, budget, service charges, staff position and problems of these libraries are given. A few proposals for the improvement of reprographic facilities are included.

INTRODUCTION

Agricultural universities in India are based on an entirely new pattern where education and training are imparted according to the needs and resources available. Unlike other universities, it became imperative to create all the three services of education, research and extension and integrate them in such a way so as to help the community in its total economic uplift and in the raising of their living standards. The integrated approach, wherever it has rightly been implemented, has produced wonderful results and played an eminent role in green revolution.

Without the library and information facilities, research and teaching activities are like fighting without arms. That is why increasing emphasis is being laid for the establishment of well-equipped libraries with all the modern gadgets which can be used to facilitate the quick supply of relevant and latest information. Among the various library equipment, reprographic ones are getting increasing importance day by day. Not only the libraries but also many other public and private institutions have also set up their reprographic units. Reprographic shops are now seen in all the big cities near courts, passport offices, academic and research institutions. The increasing popularity and recognition of reprographic techniques are due to their role in the dissemination of knowledge through duplication of documents. All the relevant information useful for a researcher can be culled out from piles of documents and be made available to him as duplicate copies right on his working desk, laboratory, residence or at the place where he/she is conducting the field work. This technological development has also facilitated the exchange of data among various institutions and individuals working at far off places. Reprographic techniques have ensured the safe preservation of old archival materials and rare manuscripts in suitable forms. A considerable amount of shelf space is saved by microforms which can be read by suitable microform readers and converted to hard copies.

There is a growing controversy almost in every campus regarding the provision of reprographic services. What should be the procedure, how much amount is to be charged for different kinds of services, who is entitled for the facility, whether the services are to be limited for the institution's clientele or other institutions are also to be served, whether there are sufficient equipment compatible to the clientele's needs, how the reprographic section is to be planned, what sort of machinery is to be acquired and staff appointed, etc. are some of the problems puzzling the administrators and require an immediate solution.

The present study is an attempt for the assessment of reprographic resources in Indian agricultural university libraries. Assessment of resources is an essential accessary for detecting gaps, wrong policies and practices and hence helps in planning, ensuring a uniform code of practice and improvement of services. It also reveals what kind of equipment are available where, whether they are being properly utilized, what is the level of comparative progress made by different institutions in providing services, what are the problems faced by them and consequently provides a basis for newly established institutions to avoid all such problems and to ensure efficient organization and better services.

In order to assess the resources of Indian agricultural university libraries, a questionnaire was circulated to all the agricultural university libraries. The Punjab Agricultural University Library which has a well-equipped reprographic unit was personally visited by the authors. Out of the 21 agricultural universities, only 12 responded, the rest did not send back the questionnaires despite repeated reminders. Out of 12 responding universities the Kerala Agricultural University informed that they did not have any centralized library and that the different constituent colleges of the University had their own arrangements. The study, therefore, reflects the sample of eleven universities only.

TABLE I

List of Universities responded and not responded alongwith abbreviations

Universities responded	Not responded
1. Gujarat Agricultural University (GAU)	1. Tamil Nadu Agricultural University (TNAU)
2. Kerala Agricultural University (KAU)	2. Punjabrao Krishi Vidyapeeth (PKV)
3. Rajendra Agricultural University (RAU)	3. Orissa University of Agriculture and Technology (OUAT)
4. Jawahar Lal Nehru Krishi Vishwa Vidyalaya (JNKVV)	4. Mahatma Phule Krishi University (MPKV)
5. G.B.Pant University of Agriculture and Technology (GBPUAT)	5. Andhra Pradesh Agricultural University (APAU)
6. University of Agricultural Sciences (UAS)	6. Assam Agricultural University (AAU)
7. Himachal Pradesh Krishi Vishwa-Vidyalaya (HPKVV)	7. Kankan Krishi Vidyapeeth (KKV)
8. Haryana Agricultural University (HAU)	8. Bidhan Chandra Krishi Vishwa Vidyalaya (BCKW)
9. University of Udaipur (UU)	9. Chandrashekhar Azad University of Agriculture and Technology (CAUAT)
10. Panjag Agricultural University (PAU)	
11. Marathwada Krishi Vidyapeeth (MKV)	
12. Narendra Dev University of Agriculture and Technology (NDUVAT)	

RESULTS OF THE SURVEY

Out of the responding universities, those which were established in the early sixties are well equipped with reprographic facilities. The Panjab Agricultural University Library has one of the best reprographic units with sufficient modern equipment and trained staff to serve the needs of the users. The G.B.Pant University of Agriculture and Technology closely follows PAU pattern for rendering reprographic services to researchers. The recently established universities (1976-1977) i.e. NDUAT, Faizabad, U.P. and GAU, Gujarat are in the developmental stages and as such not having sufficient resources to provide reprographic services. Their faculty and researchers are seeking the help of Indian Council of Agricultural Research for reprographic services.

As far as reprographic equipment are concerned, maximum number of equipment are available at PAU, Ludhiana. The universities of Udaipur, Gujarat; MAU Parbani and NDUAT Faizabad do not have xerographic facilities, the rest of all the responding universities possess the xerographic machines for providing this facility. None of the universities except the University of Udaipur has the photostat machine for providing photostat copies of documents. Among the responding universities only the PAU library has equipment like thermofax, flexo-writer, and microfilming and microfiche facilities. Only PAU, Ludhiana and HAU, Hissar have facilities of diazo-printing, microfilming. They have also reader-re-enlarger and micro-card readers. Only PAU, Ludhiana and RAU, Bihar have the electronic stencil cutting machines. Universities of MAU, Parbani; GBPUAT, Pantnagar; ARU, Bihar and UAS, Bangalore have facilities of electrostatic copying. All the universities acquired their reprographic equipment after 1967 except in the case of UAS, Bangalore which acquired a xerox machine as far back as 1960. PAU acquired its reprographic equipment during the period 1967-1974.

The information regarding the source of availability of equipment were not provided by

Table 2

Available equipment alongwith their years of purchase at different Agricultural University Libraries

		Equipments											
Sl Nó	Name of the University	Xerox	Photo-stat	Micro-Film-ing	Micro-fiche	Ther-mofax	Diazo Print-ing	Electric Cutting Machine (Stencil)	Offset Print-ing Machine	Flexo-writer	Microfilm Reader Enlarger	Electro-stat Copier	Micro-card Reader
1	PAU	1959	--	1970	1972	1968	1968	1974	1969	1967	1970	--	1967
2	JNKVV	1980	--	--	--	--	--	--	--	--	--	--	--
3	UU	--	1979	--	--	--	--	--	--	--	--	--	--
4	GAU	--	--	--	--	--	--	--	--	--	--	--	--
5	MAU	--	--	--	--	--	--	--	--	--	--	1976	--
6	HPKVV												
	i) Palampur	1973	--	--	--	--	--	--	--	--	--	--	--
	ii) Solan	1975	--	--	--	--	--	--	--	--	--	--	--
7	NDUAT	--	--	--	--	--	--	--	--	--	--	--	--
8	GBPUAT	1972	--	--	--	--	--	--	--	--	--	1977	--
9	HAU	1973	--	--	--	--	1968	--	--	--	1970	--	1976
10	RAU	1978	--	--	--	--	--	1977	--	--	--	1978	--
11	UAS	1960	--	--	--	--	--	--	--	--	--	1974	--

two of the responding universities. Even the rest of the universities did not provide the complete address of various firms from where they acquired different types of equipments. However, a few of the universities provided the detailed information and even supplied the names of models of equipment they possess. Most of the equipment possessed by the libraries are foreign-made.

Almost all the equipment in various agricultural universities have satisfactory performance except in a few cases, e.g. O.E.C. Document Printer in HPKVV, remains out of order due to lack of trained staff for handling the equipment. Another such case is that of PYEO RYS Xerographic Type KSZ (Xerox) supplied by an Indian firm to HAU. However, the various universities reported that the foreign made equipment are difficult to repair when they go out of order and thus, the services remain discontinued for a longer period.

In all the universities the reprographic section is located at ground floor except the University of Udaipur where it is located on the second floor near the periodical section. The universities which have compactly arranged sections have this unit close to all the sections. Nearness to reader's collection and periodical section seem to be the suitable location as is being followed by several universities. In all the universities the xerographic unit is centralized and located in the central library except in the case of University of Agricultural Sciences, Bangalore and Kerala Agricultural University Library. At Bangalore, the reprographic unit is not located in the central library, it is located somewhere else. At Kerala University the services are decentralized and provided in the constituent colleges.

The budget position of xerographic sections varies from university to university. A few of the universities are satisfied with the budgetary allocations, while the others are not. The libraries are not provided with sufficient non-recurring finance for developing their reprographic units i.e. acquiring additional equipment, and meeting maintenance and repair charges, etc. The universities are not spending on reprography according to some set standards and financial allocations are made haphazardly. Some of the universities are not even aware of their needs which calls for consultancy and advise from others.

TABLE 3

Source of availability of various reprographic equipment

Sl No	Equipment	Suppliers & the receiving University
1.	Xerox	Rank Xerox U.K. (P.A.U.)
		(A) Chowksi Brothers, Delhi (HAU) From Manufacturer (RAU) Graphic India, Bombay (UAS)
		(B) Macneill and Magor, New Delhi (HPKVV Palampur; GBPUAT University; JNKVV University)
		(C) Panaprint, Advani Oerlikon Bombay (HPKVV)
		(D) Das Reprographics, Calcutta (GBPUAT)
2.	Photostat	M/s Macneill and Magor Ltd., 28, Kasturba Gandhi Marg, New Delhi (UU)
3.	Microfilming	Eastman Kodak Co., USA (PAU)
4.	Microfiche	-
5.	Thermofax	Minnesota, Minning and Manufacturing Corporating (PAU)
6.	Diazoprinting	Continental Commercial Co., Ltd., Delhi (PAU)
7.	Electric Stencil Cutting Machine	Gestetner, India (PAU)
8.	Offset Printing Machine	Czetaprint Czechoslovakia (PAU)
9.	Flexowriter	Friden, USA (PAU)
10.	Microfilm Reader Enlarger	Carl-Zeiss Jena, East Germany (PAU)
11.	Electrostat Copier	Kecharam & Co., Delhi (MAU) Kores India (USA)
12.	Microcard Reader	-

A - Pylorys, Xerographic set type
B - Model Major 121
C - Panaprint
D - OCE 1250

TABLE 4

Location of reprographic units

Sl No	Name of the University	Ground Floor	First Floor	Second Floor	Near to
1.	PAU Ludhiana	Yes	X	X	-
2.	JNKVV Jabalpur	Yes	X	X	All Sections
3.	UU Udaipur	X	X	Yes	Periodical Section
4.	GAU Gujarat	-	-	-	No response
5.	MAU Parbani	Yes	X	X	All Sections
6.	HPKVV Palampur	Yes	X	X	Library collection
7.	NDUAT Faizabad	-	-	-	No response
8.	GBPUAT Pantnagar	Yes	X	X	Reference Section
9.	HAU Hissar	Yes	X	X	All Sections
10.	RAU Bihar	Yes	X	X	"
11.	UAS Bangalore	Yes	X	X	Library Collection

Only PAU library is self dependent for reprographic services. Reprographic services from other institutions are asked only if the document is not available at the parent library. Many of the libraries are utilizing the services of Indian National Scientific Documentation Centre (INSDOC), Indian Council of Agricultural Research (ICAR) and Indian Agricultural Research Institute (IARI), Delhi. The regional universities e.g. University of Himachal also utilizes the services of PAU for reprographic services.

Most of the users who ask for reprographic services are the faculty members and research scholars. The number of undergraduates asking for the services is negligible. Few administrative officers also sometimes ask for the services. Therefore, the demand for reprographic services at each university campus largely depends upon the faculty and research scholars strength.

The charges for reprographic services and rules and regulations differ from university to university. The forms of request for reprographic services also vary. The PAU library asks the clientele to sign an undertaking that no hard copies made by the library will be put to any commercial use, the copy shall not be used for any purpose other than the declared one. At PAU, copy supplied is restricted to only one article from any one issue of a periodical, for one person. Books which are copy-righted cannot be copied, except with the permission of the copywright owner which must be secured in writing. A few pages and diagrams from a book, can however be copied. The charges for xerography vary from 50 paise to one rupee for the first copy and from 25 paise to 50 paise for the subsequent copies. Some of the universities have separate policies for charges for research work and for private documents. The charges for photostat copies are one rupee per page. Majority of the universities also offer their services to other institutions.

The reprographic unit's staff position in agricultural university libraries is quite discouraging. At few places e.g. JNKVV Library, Jabalpur no separate staff is provided for the reprographic section. However, at PAU Ludhiana and GBPUAT Pantnagar, the reprographic section is headed by professional librarians and technican staff is also provided to perform the various kinds of jobs. The inadequacy of staff reflects the inefficient running of reprographic sections as the readers cannot be immediately provided with services due to lack of staff. Wherever only one technician is provided, the work suffers if the employee goes on leave as no substitutes are provided. Handling of machinery by untrained and unqualified staff exposes it to mishandling, wasteful spending and make it out of order in no time.

PROBLEMS

The various universities reported different kinds of problems. The occasional failure of electric power troubles the PAU reprographic unit and therefore, they have demanded a separate power generator to ensure uninterrupted service. The HPKVV Palampur faces the difficulties in getting the accessories being away from the major cities. The Pantnagar University is disturbed by the prohibitive service charges of dealers. Hissar University is annoyed with the foreign made machine which cannot be repaired locally. NDUAT Faizabad does not have sufficient space for providing various services and

TABLE 5

Reprography budget position

Sl No.	Name of the University	Budget Provision	Budget position sufficient/not sufficient
1.	PAU **Ludhiana**	No separate budget Included in the central library budget	Sufficient
2.	JNKVV Jabalpur	-do-	No response
3.	UU Udaipur	i) From Service Charges ii) Stationery budget	Not sufficient
4.	GAU Gujarat	-	No response
5.	MAU Parbani	Recurring expenditure of approx. Rs.6,000 annually	-do-
6.	HPKVV Palampur	Separate budget but with librarian	Sufficient
7.	NDUAT Faizabad	-	No response
8.	GBPUAT	Non-recurring approx. Rs.55,000/-	No sufficient
9.	HAU Hissar	No separate budget Included in the central library budget	No response
10.	RAU Bihar	Non-recurring Rs.15,000/- Recurring Rs. 5,000/-	Sufficient
11.	UAS Bangalore	-	No response

TABLE 6

Institutions approached by various agricultural universities for reprographic services

Name of University	Institutions Approached			
	INSDOC	ICAR	PAU	IARI
PAU Ludhiana	-	-	-	-
JNKVV Jabalpur	Yes	Yes	-	-
UU Udaipur	Yes	Yes	-	-
GAU Gujarat	Yes	Yes	-	-
MAU Parbani	Yes	-	-	-
HPKVV Palampur	Yes	-	Yes	Yes
NDUAT Faizabad	-	Yes	-	-
GBPUAT Pantnagar	Yes	Yes	-	-
HAU Hissar	Yes	Yes	-	-
RAU Bihar	-	Yes	-	-
UAS Bangalore	Yes	Yes	-	-

expanding the section. HPKVV Palampur also demands the replacement of its old Xerographic machine. The work at UU Udaipur sometimes remains paralysed due to interruption in electric power supply. The rest of the university libraries are emphatically demanding for additional budget, equipment and trained staff. The study of statistics reveals that the number of requests at PAU, having the best reprographic unit among the responding agricultural university libraries is decreasing though the number of scientists is increasing with the growth of the institution. The growth of scientists usually increases the number of requests, but here the trend is in the opposite direction. This means the scientists are either not satisfied with the services or find some alternative from where they get services cheap or at an early date.

Table 9 also reveals that all the equipment are not in constant use. Some of the services have negligible demand.

For some of the equipment, the amount being spent in terms of maintenance, space, etc. adequate return in terms of services is not obtained. A few of these services though demanded are not provided due to lack of proper staff. Some of the librarians reported, "no reprographic service - no problem". It is strange that in some prestigious agricultural universities, even a single reprographic equipment for providing duplicate copies of material is not available.

TABLE 7

Service Charges

	Name of the University	Availability of service to outside Agencies/ Institutions	Charges
1.	PAU Ludhiana	Yes	Microfilms: Rs.2.00 for the first ten pages and Re.1.00 for subsequent ten pages of the same article Slides(35mm) Rs.2.00 per slide (negative) and Rs.3.00 per slide (positive) in card-board mount. Projection Prints : Rs.2.00 for first two pages and Re.1.00 for the subsequent two pages of the same article. Stray prints will be Rs.2.00 each. Xerographic Copies : Re.1.00 for the first page and 50 paise for each of the subsequent pages of the same article. The charges for the xerox copies of private documents, certificates etc., for the officials of this university only will be Re.1.00 for each copy of a document. Offset Printing : Rs.4.00 per plate plus cost of paper. Electronic Stencil: Rs.4.00 per plate plus cost of paper.
2.	JNKVV Jabalpur	No	No
3.	UU Udaipur	Only one constituent colleges of the University	i) Research work Xerox = 50p for 1st page = 30p additional page ii) Other work Xerox = 75p for 1st page = 50p additional page
4.	GAU Gujarat	-	-
5.	MAU Parbani	Yes	Xerox = 50p for 1st page = 25p additional page upto four copies
6.	HPKVV Palampur	Yes	Xerox = Re.1.00 for 1st page = 50p additional page
7.	NDUAT Faizabad	-	-
8.	GBPUAT Pantnagar	Yes	Xerox = Re.1.00 for 1st page = 50p additional copy Photostat = Re.1.00 each copy
9.	HAU Hissar	No	Xerox: (Personal work) = Re.1.00 for 1st page = Rs.1.50 additional page (Research work) = 50p for 1st page = 25p for subsequent copies upto five
10.	RAU Bihar	Yes	No charges for department work Xerox = Re.1.00 for 1st 2 pages = 50p additional pages
11.	UAS Bangalore	Yes	Xerox (Technical articles) = 50p first copy = 50p additional copies. Certificates and similar documents = 70p per page.

TABLE 8

Reprographic Units and Staff Position

Name of the University	Staff Position with qualification and grade		
	Professional	Technical	Non-Technical
1. PAU Ludhiana	One M.A.,M.Lib.Sc. 700-1600	Three Matric One 600-80-1100 One 400-600 One 700-1200	Three Matric/Under Matric Two 400-600 One 350-400
2. JNKVV Jabalpur	No separate staff provided		
3. UU Udaipur	One graduate with B.Lib.Sc. with experience in Xerox 550-1070		
4. GAU Gujarat	-	-	-
5. MAU Parbani	-	-	One Senior School Certificate 200-360 One Matric with Sc. 400-600
7. NDUAT Faizabad	-	-	-
8. GBPUAT Pantnagar	One M.A. with M.Lib.Sc. 700-1300	One Inter with Cert.Lib.Sc. 230-380	-
9. HAU Hissar	-	One R.L.A. B.A., C.Lib. 525-1050	-
10. RAU Bihar	One Librarian	-	-
11. UAS Bangalore	One B.Sc with Physics 600-1300	-	-

TABLE 9

Number of Requests for Different Reprographic Services at PAU Library

Year	Xerox	Services						
		Electronic Stencil	Micro-Filming	Offset Press	Thermofax	Diazo Printing	Flexo writer	Electro-stat copier
1977-78	677	40	19	-	-	-	-	-
1978-79	523	82	1	1	-	-	-	-
1979-80	829	76	-	-	-	-	-	-
1980-81	511	27	-	-	-	-	-	-

In none of the universities self operating automatic machines are available. The scientists themselves have to approach, search the document, fill up the form, deposit the amount and again come back to receive the document after some period.

Reprographic technology is fast developing and very sophisticated equipment are being developed or are in the process of development. There is no scheme for the replacement and improvement of equipment. Consequently, these developments are not utilized for the service of users due to lack of resources.

In India sufficient number of equipment are not developed and produced. Therefore, the libraries have to acquire them from other developed countries which not only involve foreign exchange but also problems of repair of equipment at a later stage when they go out of order.

There is considerable growth of research and development activities and consequently of paper work but growth of reprographic facilities are not keeping pace with it.

The recurring needs of spare parts, special duplicating paper, and other materials are not readily fulfilled and as such regularity of services is disturbed.

Researchers are not conscious of reprographic services, so very few requests are made to the libraries. Agricultural Universities have not set up the upto-date reprographic units which may cater to most of the demands of the researchers and facilitate the continuity of the service.

PROPOSALS

1. The various reprographic equipment may be acquired after the assessment of user's needs. The records maintained at all established old universities may provide some clues as to the popular services. Such an assessment will help to acquire only those equipment, which will be really useful.

2. Though every university has the right to decide according to its convenience yet uniformity of practices will help to bring order in chaos. All the agricultural universities may draft uniform charges for the various services. Such charges should be based on no profit no loss basis, rather they should be subsidized by additional budgetary provisions as the scientists are usually not getting sufficient amount for contingencies and sometimes they have to spend from their own pockets.

3. A service contract with the firm may be ensured while purchase of any equipment is being made, since competent mechanics for repair are not available when an equipment goes out of order. If such a contract is not possible, one of the technicians from the university may be deputed to the business firm to learn different kinds of repairs so that equipment may be immediately repaired whenever they go out of order and users may be provided with services without any break.

4. A formula for budgetary allocations may be developed keeping in view the users especially the researchers. Additional funds may be provided to the universities which are in the developing stage so that they may be able to develop their reprographic units besides maintaining the existing services.

5. Indian models of various reprographic equipment may be developed. For this purpose CSIO, Chandigarh, may develop the models suitable for the Indian libraries and industries may be encouraged to undertake production. This will not only save a lot of foreign exchange but also facilitate easy and immediate repair of equipment as the spare parts and mechanics will be easily available.

6. Besides an agreement among agricultural universities for reprographic services,an agreement between universities and agricultural research institutions will also be of help for mutual sharing of reprographic resources and optimum utilization of costly equipment.

7. There is also a need for formulating a standard for allocation of staff to reprographic unit alongwith their qualifications and experience.

8. Allocation of separate funds for reprographic services is very much essential. The librarian/officer-in-charge of the unit may be empowered sufficiently for drawing and disbursing the amount for proper functioning of the machinery.

9. For those services which are more popular more number of machines may be provided instead of acquiring different varieties of reprographic equipment. For example, at PAU, Xerox is much more a popular service as compared to other services.There-

fore, another xerox machine can be acquired instead of any other category of equipment so that the continuity of this service may be facilitated.

10 There is need of training courses for the reprography technicians and operators Any organization which has got sufficient number of equipment to impart practical training and resources to provide theoretical knowledge may act as a reprography training centre.

11 Immediate alternatives may be provided if a machine goes out of order. Reprographic machines should not be kept non-functional for a long period wheh they go out of order because this practice not only results in suspension of duplication facilities to researchers but also their lack of faith in the university's reprographic unit.

12 Operators and administrators should keep themselves aware of the scarcity of materials and likely defects well in advance so as to ensure uninterrupted service to the users.

13 The financial assistance to reprographic units should not end after making the financial provisions for purchase of equipment and their installation. Recurring financial allocations may also be made for their maintenance.

14 A union catalogue of microform holdings of agricultural university libraries and other important research centres may be prepared.

15 The Indian Agricultural Research Institute may develop a central unit which may co-ordinate and cater to some of the needs of all the agricultural universities and research institutions.

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Appendix

QUESTIONNAIRE

1. Name of the University ______________________

Name of the Library ______________________

Year of Establishment ______________________

2. Do you provide the Xerographic services? **Yes/No**

(a) If yes, which of the following services are provided by your library?

Tick (   ) whichever is applicable

i) Xerox ____________________

ii) Photostat ____________________

iii) Microfilming ____________________

iv) Microfiche ____________________

v) Thermofax ____________________

vi) Diazo printing ______________________

vii) Any other ______________________

(b) If no, what are the reasons?
Tick ( ) whichever is applicable

i) Lack of funds ______________________

ii) Lack of trained staff ______________________

iii) Costly equipment ______________________

iv) Any other ______________________

(c) When and which reprographic machine was installed in the library

Machine	Year of installation

3. List of reprographic equipment available in your library along with trade name, procurement source and performance

	Name	Procurement/Source	Performance: Satisfactory/ Not Satisfactory
A			
B			
C			
D			
E			
F			
G			
H			
I			
J			
K			
L			
M			

4. Is your reprographic section located -
Tick ( ) whichever is applicable

(a) i) On Ground Floor ____________
ii) On First Floor ____________
iii) On Second Floor ____________
iv) On Third Floor ____________

(b) i) Near Collection ____________
ii) Near Periodical Section ____________
iii) Near Reference Section ____________

5. Your reprographic unit is : i) Centralized ____________
ii) Decentralized ____________

6. Give amount of funds yearly provided in the budget for reprographic services
a) Non-recurring Rs. ____________
b) Recurring Rs. ____________
c) Do you think the budget provision is adequate? Yes/No

7. What measures do the library undertake when a reprographic equipment goes out of order?

____

____

____

____

8. Do you approach the following agencies for reprographic services?

INSDOC	Yes/No
ICAR	Yes/No
Any other	____________

9. Indicate the extent of use of reprographic facilities by type of clientele :

	Most used	Somewhat Used	Least used
i) Undergraduates			
ii) Postgraduates			
iii) Faculty Members			
iv) Any other			

ASSESSMENT OF REPROGRAPHIC RESOURCES

10. Do you provide reprographic services to institutions or individuals outside the university? Yes/No

If yes, under what conditions and terms?

____

____

____

11. Indicate the charges fixed for various reprographic services

	Services	Charges
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

12. Indicate the staff provided in the reprographic section

	No.of posts	Qualifications	Scale
i) Professional	______	______	______
ii) Technical	______	______	______
iii) Non-technical	______	______	______

13. Indicate any changes which need to be made in the reprographic section (Facilities/ staff/budget etc.) to make the services more efficient.

i) Facilities ____________________

____

____

ii) Staff ____________________

____

iii) Budget

14. Indicate problems, if any, regarding the functioning of reprographic unit.

(Thanks for your co-operation)

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NEED FOR HEALTH SCIENCE INFORMATION NETWORK IN BANGLADESH

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Better medical services and research call for accurate and prompt supply of relevant information and literature. For procurement of appropriate materials and effective dissemination, libraries are indispensable. In order to make the services available throughout the country, good bio-medical libraries have to be developed. Library services available in Bangladesh are poor. Cooperation among libraries and building up a nationwide health information network can ease the problem.

INTRODUCTION

Obviously better medical libraries can initiate and render better services. Researchers in the field of medicine not only need accurate but prompt supply of relevant information and literature both local and foreign. Efficient organisation of library services is a prerequisite for speedy procurement of such information and materials[1]. In this context cooperation among the bio-medical libraries in Bangladesh and organising them into a network to improve the library services is essential.

INFORMATION EXPLOSION

This is the age of "publication explosion' Everyday billions and billions of publications are coming out containing incalculable information resulting in "information explosion". Information is taken to mean timely and specific knowledge acquired or derived. These information are essential for research and progress in any field. The world has shrunk and the destinies of all of us are interlocked; no single event or action is without international import. This phenomenon of the interdependence of nations is largely due to the rapid development of modern electronic communication systems and also the facility of distribution of the printed document Books have undergone many changes in distribution and format allowing increased extension of more and more books to more and more people, including scientists and specialists, than ever before and at a faster rate.

Information, both conventional and non-conventional are generated at a faster rate than at any previous time in the history of mankind[2], science and technology have advanced in supersonic speed. So, it has become a problem for librarians, documentalists and information scientists to know what information are being incorporated in books,periodicals, monographs, etc. throughout the world and what has been discovered in any particular field of knowledge. Librarians have been trying to control these information bibliographically and storing them in the computerised system to ensure their best use by research personnel,scientists and others.

MEDICAL LIBRARIES

A Medical library is a workshop for the persons engaged in medical profession and, no medical scientist and researcher can work and make any test or experiment without a resourceful and well-equipped library or information centre at hand. The science of medicine itself, now-a-days, is advancing so rapidly over so wide a front that communication between specialists is becoming increasingly difficult. Information is a universal commodity and it tends to disregard the geographical and administrative boundaries and restrictions. In order to collect accurate and desired information sophisticated techniques and equipment are required. To procure, process, preserve and disseminate every bit of information, a library is a prime need for every medical institution. The library is the nervous system of the medical service, hence, it must be well organised, so that the medical scientists and research workers can be posted with latest developments in their fields.

MEDICAL LIBRARY SITUATION OF BANGLADESH

Bangladesh is a developing country of the Third World, so, for her proper development it is high time to adopt a new philosophy and bring in a change in attitude towards medical libraries and librarians. In the interest of better and efficient medical service a network of co-ordinated and integrated medical libraries has to be created and developed without any further delay. According to a recent survey[3] most of the bio-medical libraries do not have adequate resources and professional staff, services are also very poor. Still, there are libraries which are trying to serve their clientele in spite of so many handicaps. These libraries, in order to keep the prestige of the profession, are serving the research workers and medical scientists in their day-to-day information need so that they do not feel frustrated. Since the libraries in Bangladesh are mostly located in urban areas and mainly in the capital city of Dacca, doctors and paraprofessional personnel working in the periphery are practically not being served by these libraries. Due to bad communication system, libraries in the districts cannot maintain close link with other libraries. Hospital and medical libraries are not at all well-planned. They lack funds, staff, material, equipment, space and do not even have separate budget provisions.

The number of bio-medical libraries are also inadequate and too bizarre in many respects and only a few of them contain reliable, relevant and up-to-date material and are able to render some services such as, literature search, current awareness, bibliography, selective dissemination of information, etc, to the users. Planners and administrators have been overlooking the problems of medical libraries, as a result qualified librarians are not joining these libraries.

The following three types of problems need be specially mentioned here. They are :

a) The physical crisis resulting from the sheer bulk of the various types of educational material;

b) The operational crisis arising from the lack of adequate professional personnel time required to process each item and the resultant cost, and

c) The intellectual crisis resulting from the enormously complicated structure of the medical information which makes the retrieval of a particular piece of information a slow and costly affair.

There is no denying the fact that no single medical library or health information centre can expect to acquire all the world's medical literature even on a particular specialisation or even a significant part of it without tremendous financial and manpower resources. The problem can only be overcome by introducing a national information network within the libraries of the country. In order to initiate such a programme of collaboration a National Medical Library and Health Information Centre was set-up in Dacca in the year 1975 with financial assistance from the Asia Foundation. It is responsible to maintain contacts with the international information centres for latest information in the fields; to produce relevant audio-visual teaching aids to cater to the needs of the local libraries; to train unskilled workers of the medical libraries; to start interlending of library materials; to initiate exchange of duplicate medical literature between the libraries to help build necessary collections; to compile union catalogue of periodicals, etc.

CONCLUSION

In order to implement government's policy[4], medical administrators and planners should establish new libraries and develop existing bio-medical libraries and information centre so that medical professionals and others engaged in the field of medicine and its related branches can quickly obtain new knowledge, failing which total health care of the people will suffer.

To make World Health Organisation's endeavour 'Health for all by the year 2000' a success, Government of the People's Republic of Bangladesh have chalked out an elaborate programme to set-up more hospitals and medical centres throughout the country to make basic medical care services available at the grass root level.

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PUBLIC LIBRARY DEVELOPMENT: AN ASSESSMENT OF PRESENT TRENDS IN NIGERIA

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Results of a user study conducted over a six-day period in seven public libraries of Nigeria using questionnaire method have been presented. It has been found that 51.5% of users do not use the library daily because the library does not open daily. 48.7% of the users cannot use the library daily because of long distance. 51.2% of the users come to the library on foot. 38.9% of the users are to spend about 40 minutes to reach the library. It has been recommended that library should be brought closer to the people and efforts should be made to attract more people to the library.

INTRODUCTION

The current United Nations estimates indicate a population of about 70 million in Nigeria, by far the largest in Africa. A programme aimed at achieving universal primary education was introduced in September 1977. In January 1973 there were 4,662, 400 primary school pupils and 495,143 pupils in secondary school and training colleges and 49,301 students in the thirteen Nigerian universities in October 1977/78 session[1].

Serving the educational, informational and recreational needs of Nigerians are 145 libraries of various kinds — 21 college and polytechnic libraries, 47 ministry libraries (together with their branches), 43 public libraries, 18 special libraries and 13 university libraries[3]. The purpose of this study is to examine the present trends in public library development in Nigeria. Specifically, the study will provide answers to the following questions:

1) Why do users fail to use public library daily?
2) By what means do public library user get to the library?
3) How long does it take users to get to the library?

One must understand what the public libraries in Nigeria are supposed to do before one addresses one self to the question of present trends in public library development. Behavioural studies of man make it clear that he is a multigoal-directed creature. Studies of group behaviour have led some organizational theories to conclude that organizations also share this characteristic[4]. Thus, statements about the purpose and responsibilities of the Nigerian public libraries have been many, such as, a resource for scholars, a centre of information, an aid for students, a means for self education, and a centre for amusement[5]. As in the real life situations, multiple causes and conflicting priorities are the rule rather than the exceptions in public libraries. The public library objectives, functions, and operations have no meaning outside the community it serves, and any argument concerning them have no validity when considered independently of the social setting. The usefulness of any public library depends on its ability to serve the community as a general centre of reliable information and to provide opportunity and encouragement for people of all ages to educate themselves continuously.

Apart from occasional papers and articles in library service periodicals, there is remarkable lack of studies on public library development in Nigeria. National Library of Nigeria made some efforts in 1972 to find the number of libraries by types and number of qualified librarians[6]. Harrocks[7] examined Regional Central Library at Enugu and found that use of the library increased sharply with the level of schooling. Almost 75 percent of those entering the central library had been educated to secondary school level or above. There are ten males to every female and almost all of them fall within the 18-24 years age group. As useful as this study is, it was limited to Enugu and other parts of the country are, left untouched. More recently, IFLA/ICAE's study[8] of seven public libraries in Lagos, Nigeria has provided a different perspective. The evaluation showed that less than half of the library users were satisfied with the library services. Unless the previous study the IFLA/ICAE study did not study time it takes users to get to the library, means of transportation to the library and how often users patromise public library. Besides, no attempt was made to compare its findings with libraries in developed countries. By comparison with other libraries in more developed countries, librarians in developing nations can gain more courage or experience. This study will help public libraries to set goals for planning effective public library services.

THE METHODOLOGY

After a thorough investigation of various research techniques, it was decided that the questionnaire method would be the best suited in the context of the present study. The questionnaire method was also chosen because it seemed the most economical method involving less time and effort in its administration.

The questionnaire blanks were distributed to persons entering the library during a typical six days operation in seven public libraries, randomly selected by stratified sampling from 43 public libraries in Nigeria. The country was divided into North and South, and of the 25 public libraries in the South, 4 public libraries were randomly selected. Of 18 public libraries in the North, 3 public libraries were randomly selected. The investigator(s) or/their representative(s) were around to help persons in completing the questionnaire. The questionnaire blanks were distributed at the entrance of the selected libraries.

RESULTS AND COMMENTS

Reason(s) for not using the library daily

A library should be adapted to the environment it is designed to serve. Its techniques should be suited to its users. Finally, its services should be accorded with a clear, pre-established programme. These are the fundamental truths that every librarian must know and take into account. It is disheartening to note that a large number of users indicated 'library not opened daily' for not using the library daily. 684 users, or 51.5 percent are in this group (Table I). In Kaduna, Maiduguri, Port-Harcourt and Kano public libraries, 67.4, 62.0, 51.8 and 51.3 percentage of respondents indicated 'library not opened daily' as the reason for not attending daily. This is different from what obtained in the United States and Britain[8]. From the author's observations and experience it is known that no public library opens in Nigeria on Sundays and public holidays. Besides, most public libraries open from 8.00 a.m. to 8.00 p.m., Monday to Saturday. In a country where readers are hungry for place to read there is no justification for public libraries not to open on week ends and public holidays.

An impressive number of users indicated library too far 'from my house' as reason for not using library daily. 646 users, or 48.7 percent are in this group. Apart from few urban cities, most towns in Nigeria are having only a public library, several others with reading rooms only. The government will be doing the nation a lot of good by establishing more libraries at the doorstep of its people. The introduction of mobile libraries in some states of the Federation is a step in the right direction.

Means of Transportation to Libraries

The means by which people get to the library may have an effect upon the distance they are willing to travel. In the advanced countries of the United States and Britain the majority of the library users travel to the library by cars[9]. Unlike the advanced countries the majority of library users in this study walked to the library (Table II). Of the 1328 users in the study, 680 users, or 51.2 percent walked to the library. The reason for this may be due to the fact that few people own cars in Nigeria. Besides, public transportation is few, poor and expensive. No vehicles are manufactured in the country. There are only ten or so assembly plants for motor cars. As expected, a sizeable number of users come to the library by bicycle (10.1 percent) and motor-cycle (7.8 percent).

Time Users Spent Before Getting to the Library

The amount of time users spent before getting to the library may affect their use and opinion on public library services. This is particularly true in the Nigerian context, where the bulk of library users travelled directly from their home to the library. Luckham[10] and Marsterson[11] found membership of British libraries decline with distance from the library. In the advanced countries of the United States and Britain most library users travelled 15 minutes or less to get to the public library[12]. Unlike the advanced countries an impressive number of 517 users, or 38.9 percent indicated a travel time of 40 minutes or more (Table III). Another 155 users, or 11.5 percent indicated 30-39 minutes. Few indicated a travel time of 10 minutes (9.3 percent). The fact that many readers are staying at long distances from the library services is relevant here since special postal services or

TABLE I

Reason(s) for not using the library daily

Reason(s) for not Using Library daily*	SOUTHERN LIBRARIES								NORTHERN LIBRARIES						TOTAL	
	ENUGU No.205		IBADAN No. 210		OWEERI No. 225		PORT-HARCOURT No. 195		KADUNA No. 175		KANO No. 160		MAIDUGIRI No. 158		No.1328	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Not opened daily	98	47.8	84	40.0	103	45.7	101	51.8	118	67.4	82	51.3	98	62.0	684	51.5
Too far from my House	93	45.4	68	32.4	78	34.7	84	43.1	93	53.1	128	80.0	102	64.6	646	48.7
Does not have all I want	87	42.4	102	48.6	88	39.1	71	36.4	42	24.0	48	30.0	93	58.9	531	40.0
Lack of Transport	52	25.4	42	20.0	63	28.0	61	31.2	50	28.6	54	33.8	82	51.9	404	30.4
OTHERS	25	12.2	30	14.3	18	8.0	16	8.2	6	3.4	25	15.6	24	15.2	144	10.8

* Respondents were asked to check as many answers as applicable

TABLE II

Means by which Library Users Travelled to the Library

Means by which Users Come to the Library	SOUTHERN LIBRARIES								NORTHERN LIBRARIES						TOTAL	
	ENUGU No. 205		IBADAN No. 210		OWERRI No. 225		PORT-HARCOURT No. 195		KADUNA No. 175		KANO No. 160		MAIDUGURI No. 158		**No.1328**	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
By Taxi	61	29.8	54	25.7	45	20.0	52	26.7	38	21.7	8	5.0	29	18.4	287	21.6
By Bus	23	11.2	18	8.6	5	2.2	32	16.4	19	10.9	12	7.5	15	9.5	124	9.3
By Bicycle	19	9.3	24	11.4	28	12.4	13	6.7	24	13.7	17	10.6	9	5.7	134	10.1
By Motor-Cycle	13	6.3	20	9.5	9	4.0	7	3.6	18	10.3	25	15.6	11	6.9	103	7.8
Walking	89	43.4	94	44.8	138	61.3	91	46.7	76	43.4	98	61.3	94	59.5	680	51.2
TOTAL	205	100	210	100.0	225	99.9	195	100.1	175	100	160	100	158	100	1328	100

TABLE III

Time Users Spent Before Getting to the Library

Travelling Time	SOUTHERN LIBRARIES								NORTHERN LIBRARIES						TOTAL	
	ENUGU No. 205		IBADAN No. 210		OWERRI No. 225		PORT-HARCOURT No. 195		KADUNA No. 175		KANO No. 160		MAIDUGURI No.158		No.1328	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Less than 10 Minutes	27	13.2	6	2.9	35	15.6	31	15.9	4	2.3	12	7.5	8	5.1	123	9.3
10 - 19 Minutes	25	12.2	34	16.2	23	10.2	22	11.3	13	7.4	108	67.5	24	15.2	249	18.8
20 - 29 Minutes	39	19.0	60	28.6	44	19.6	35	17.9	56	32.0	19	11.9	31	19.6	284	21.3
30 - 39 Minutes	11	5.4	70	33.3	8	3.6	19	9.7	14	8.0	8	5.0	25	15.8	155	11.7
40 or more Minutes	103	50.2	40	19.0	115	51.1	88	45.1	88	50.3	13	8.1	70	44.3	517	38.9
TOTAL	205	100	210	100	225	101.1	195	99.9	175	100	160	100	158	100	1328	100

mobile libraries may be necessary to overcome geographical difficulties. It is unfortunate that few states in Nigeria provide mobile library services.

Summary, Conclusions and Recommendations

An analysis of the present trends in public library development in Nigeria showed that public library is yet to be provided to meet the needs of the users. Users do not use the library daily because the library do not open daily. The bulk of the public library users walked to the library in forty minutes or more.

In order to formulate plans for future development of effective public library services, the specific conclusions to be drawn from the findings of this study are set down in the form of certain recommendations to serve as objective guides.

The library should be brought closer to the people. Services should be extended to villages and street corners via book mobiles. The agency most likely to make such provisions effective is the Ministry of Education. In the light of considerable knowledge of conditions throughout the country, it is the author's opinion that public library development in the rural areas and small towns will be best served by concentrating on the improvement of libraries in schools and extending the scope of the school library service (including hours of opening) to include the general public in the surrounding areas.

Libraries should attract more people to existing library facilities. Unless the public library received substantial use it does not fulfil its functions in the community. Poor use of the libraries are chiefly from three causes, namely, ignorance of the service, prejudices or misconceptions and the absence of the desire to use books. The remedy lies in more publicity of the library and its services - the widespread dissemination of information about the library, where it is, when it is open, who can use it, and what it provides, will produce good results.

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LETTERS TO THE EDITOR

In his paper [*]Basu has depicted a clear picture of the difficulties of journal subscriptions which are faced by the serials librarians in the Indian context and offered a few suggestions to overcome those constraints. It has been, indeed, a pragmatic approach that has ever been published. A few comments on it are offered.

UNRELIABLE AGENCIES

While blaming the subscription agencies for not getting the missing issues replaced, most of the serials librarians seem to be unaware of real casequences. No agency is ever worried about the missing issues. All that they want is an attractive discount. Basu in his paper, truly said "agent sends a copy of the reminder letter for the publisher to the subscriber, the original of which is normally never posted".

At times the problems that agencies create would be even unthinkable, because, subscriptions may perhaps be handled by unskilled personnel. As a matter of fact the payment through agency is neither desirable nor necessary. Yet, serials librarians have been compelled to go for agency due to several reasons, some of which are listed below:

1. Direct payment needs every title to be processed separately that involves much manpower; and
2. Obtaining payment in foreign currency is not an easy task for certain institutions. Lack of proper organizational infrastructure further deteriorates the situation.

INDIAN POSTAL SYSTEM

Serials librarians, who are keeping track of the missing issues, in most cases get the stock reply as 'contact your local post office'. It is ridiculous and worse than not getting a reply. Fuel and Metallurgicals Ltd, London, stated in a reply to a claim for non-receipt of a single issue, that they receive 95% of claims only from India where they have only 5% of their total business. It means that claim rate from India is 1900%. What a surprising data they have discovered. Likewise, many publishers find Indian Postal System as a good excuse for not replacing the copies. Indian postal system is, of course, neither totally reliable nor efficient, but it is being underrated. Not only do publishers blame Indian Postal System for non-delivery of the issues, which were said to have been mailed by them but they do extend their valuable suggestion for for air-mail delivery. It is quite absurd. While the Indian Postal System is alleged to be absolutely inefficient, how do they ensure that the mail reaches the right place within India, as if Indian Postal System donot have anything to do with air-mail service. All of which implies that blame on Indian Postal System is the good excuse the publishers have invented.

ACCELERATED AIR-MAIL SYSTEM

Recently a few leading publishers, mostly from England, have started offering air-mail service with no additional charge. In this novel method a publisher appoints an agency in India, to whom all the copies that are to be distributed within India are sent and thereafter the issues are sent to all subscribers by the agency. In some cases, issues are being sent by registered post, ensuring correct delivery. Regardless of whether payment is made through agency or directly, issues be distributed through the appointed agency.

Thus, India Book House, New Delhi, represents Academic Press, England. This system has been proved to be fruitful. Likewise, Constellate Consultants (P) Ltd., New Delhi, represents Engineering Index Inc, USA.

Universal Subscription Agency, Kanpur, has claimed that they would avail such faculties for the journals published by certain leading publishers. Some of these publishers are:

1. Pergamon Press, England

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[*] Basu A K: Missing periodicals - the problems, reasons, and remedies. Ann Lib Sci Doc 1979, 26(1-4), 57-60.

2. IPC Business Press, England
3. Morgom - Grampian Publishers, England
4. Institution of Electrical Engineers, England
5. Trade and Technical Press, England
6. Applied Science Publishers Co; England
7. Allerton Press, U.S.A.
8. Elsevier Sequoia S.A Switzerland

Implementation of Accelerated Air-Mail System would, certainly, pave the way for betterment of journal subscription.

CLAIMING AT RIGHT TIME

No matter, how genuine the reminders are, publishers have the ready-made excuse to say either "PREMATURED CLAIM" or "TOO LATE, OUT OF PRINT". However, following points should be observed while claiming for non-received issues.

1. Second and further reminders should be type-written letters;
2. While asking for an invoice or remitting the payment, non-receipt of issues may be mentioned in the letter which enhances the possibility of replacement;
3. Claim should be very selective and tentative, the reason being that frequent and immatured claims do often deteriorate the subscriptions.

V. BALASUBRAMANIAN
Jyoti Limited
Baroda-390003

BOOK REVIEWS

Requiem for the card catalog; management issues in automated cataloguing, ed. by Daniel Gore, Joseph Kimbrough and Peter Spyers-Duran. Westport, Conn., Greenwood Press, 1979. xvi, 200p. (New directions in librarianship, no.2). $ 17.50. ISBN 0-313-20608-2 (Reviewed by T V Prafulla Chandra).

This book is a collection of papers presented at the 'Conference on Management Issues in Automated Cataloguing' held at Chicago from 3rd to 5th November, 1977 and sponsored by the Associated Colleges of the Midwest. The contents, consisting of ten articles and a panel discussion offer a clear and readable account of both the theoretical and practical aspects of automated cataloguing, discussing the following major issues: technical and cost factors, on-line feasibility, personnel and management problems, network concerns, and user satisfaction.

Bret Butler provides a lucid account of the differences between a collection data base and a resource data base, and discusses the technological and cost aspects of the conversion of bibliographical data into machine-readable form.

Peter Spyers-Duran presents the results of his survey of state-supported academic libraries in the United States in 1977 on the effects of automation on organisational change, staffing, and human relations of professional catalogers and support staff.

S. Michael Malinconico discusses the suitability of a Computer Output Microform (COM) catalog as a potential replacement for the card catalog and concludes that COM can be an economical alternative to the on-line system, providing much of the flexibility of the latter, at a price comparable with the card catalog.

Glyn T. Evans examines the relationship among the constituents of an on-line shared cataloging network, taking OCLC system as an example.

Sanford Berman's delightful piece, while mentioning the many idiosyncratic cataloging practices, pleads for demystifying the catalog. He feels that automation coupled "with a decision to catalog intelligibly, usefully, and fairly" would produce "a catalog that turns on rather than alienates the user".

Henriette D.Avram examines the impact of national networking on catalog management decisions and provides useful guidelines for libraries contemplating to join a network, to select the right type that would meet their needs.

Mary L.Fischer presents a lengthy historical account of the Los Angeles County Public Library's experiences in automating its catalog, culminating in the installation of COM catalogs in 1977. Inclusion of many tables on various catalog products and on the usage pattern of Microfilm Master Catalog illustrate the author's arguments.

Robert H.Blackburn's interesting narrative of the switchover from a card catalog to COM catalog at the University of Toronto in 1975, provides deep insights of the problems of management during the transition period.

In his paper on shelf-list conversion, John Kountz warns of "the more subtle snares and traps that festoon" the path of conversion from manual to machine files and offers sage advice to successfully manoeuver through them.

H. William Axford points out the "cottage industry mentality" of the library profession "which views librarianship largely as a matter of individual artistry rather than a coordinated institutional endeavour" and opines that this attitude is adversely affecting the development and utilization of automated data bases. He proves his point with an evaluation of the OCLC, SOLINET, and NELINET systems revealing the inadequacy of their services and mismanagement of human and material resources.

The concluding chapter presents the transcript of a panel discussion on "Key issues in managing the automated catalog" such as need for quality control of bibliographic data bases; reluctance of libraries in closing their card catalog and adopting the automated catalogs; role of commercially owned data bases; scope current state of the art and future prospects of automated cataloging.

This well-edited and informative book throws much light on the many puzzling issues of automated cataloging. It is not a precise 'how-to-do-it'manual; rather, it offers a 'how-we-did-it' description with valuable practical advice. It is essential reading for all library administrators, planning or currently using some form of automated cataloging. It will enable them to take better decisions in this difficult and challenging task of automating the catalog. It is a significant and welcome addition to the meagre literature available in this field.

The structure and governance of library networks, (ed.by) Allen Kent and Thomas J Galvin. New York, Marcel Dekker, 1979. (Books in library and information science, 27). xvi, 352p. $ 37.50 ISBN:0-8247-6866-3 (Reviewed by B Guha).

The present volume is the outcome of a conference held in Pittsburgh in November 1978. This conference was a forerunner to the 1979 White House Conference on Library and Information Services on the theme of "equal opportunity of access to information". The Pittsburgh Conference provided an opportunity to librarians, information specialists, and others engaged in the provision of information to define the problems of network operation centering on management and organisation, standardisation, network membership, choices among complex technological options, measures of network performance, and so on. Authentic review papers on different aspects of networking were prepared and presented by experts and they also reacted to the issues identified by other participants.

The review or position papers, response to them from the panelists, and the discussions that followed are all presented in the present volume in five main parts. They are as follows: 1) Network anatomy and network objectives, 2) Network topology: functions of existing networks, 3) Impact of technology, 4) Governance of library networks: purposes and expectations, and 5) Governance of library networks: alternatives for the future. The sixth and final part is labelled as conclusions.

The first position paper in part one has been contributed by no less a person than Allen Kent, whose contribution in the field is well known. The paper is an excellent review of the subject of network anatomy and objectives. The second position paper on network topology and functions, an extensive and useful review, has been contributed by James G Williams and Roger Flynn of the University of Pittsburgh. The third part provides a glimpse of the very interesting information technology world, points out the recent trends and directions and looks at some of the implications for the governance of library networks. The position paper here is contributed by William D Mathews of the National Commission on Libraries and Information Science. Parts four and five are both on different aspects of the important problem of governance of library networks. The two position papers have been contributed respectively by K Leon Montgomery and C Edwin Dowlin of the University of Pittsburgh, and John W Bystrom of the University of Hawaii.

The position papers, the responses from the panelists, and the discussions contained in the volume together provide a complete and most authentic picture of library network structure, objectives and governance Library networks and consortia at various levels and for various functions are realities in a country like the USA. Because of this factor the contributors and participants to this Conference have been able to analyse the problems so correctly in their proper perspective and in such details. In a country like India the idea of networking is still at the discussion level.. We are at the stage of building up professional and public opinions in favour of library networks. Even then, most of the ideas, views, and words of wisdom that are contained in this handsome volume will be of immense interest and useful to our practising librarians, teachers, students and administrators in our country.

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